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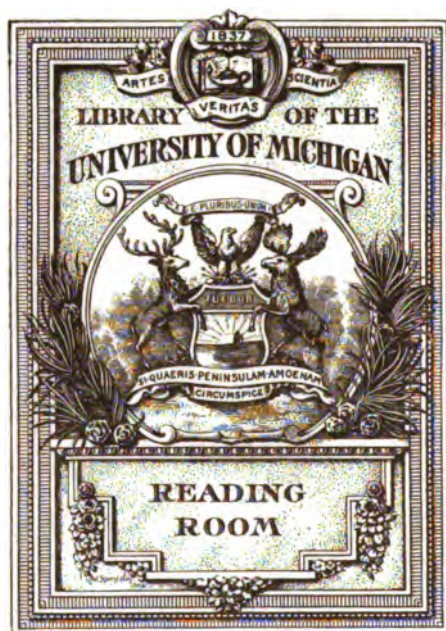
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**APPLETON'S
NEW PRACTICAL
CYCLOPEDIA**

VOLUME IV

APPLETON'S NEW PRACTICAL CYCLOPEDIA

*A NEW WORK OF REFERENCE
BASED UPON THE BEST AUTHORITIES, AND SYSTEMATICALLY
ARRANGED FOR USE IN HOME AND SCHOOL*

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VOLUME IV

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KEY TO PRONUNCIATION

ă, as in *fate*.

â, as in *fat*.

â, as in *fall*.

â, as in *father*.

â, as in *welfare*.

ê, as in *meet*.

ê, as in *met*.

ê, as in *her* and *eu* in French *-eur*.

î, as in *five*.

î, as in *it*.

ô, as in *sober*.

ô, as in *not*.

ô, as in *fool* or *spoon*, or as *u* in *rule*.

ô, as in *foot*.

ô, as in *Goëthe* and *eu* in French *nouf*.

û, as in *mule*.

û, as in *but*.

û, produced with lips rounded to utter *oo* and tongue placed as in uttering *e*.

û, as in *burn* or *burg*.

ch, as in German *ich*.

kh, as *ch* in German *nacht* and Scotch *loch*, and as *g* in German *tag*.

th, as in *thin*.

th, as in *though*.

ñ, French nasal *n* and *m*; pronounce *ang*, *ong*, *ung*, etc., in usual way, but without sounding the *g*.

ñ, Spanish *n-y*, as in *cañon*; French and Italian —*gn*, as in *Boulogne*.

APPLETON'S

NEW PRACTICAL CYCLOPEDIA

VOLUME IV

Lap'ithæ, in Greek mythology, a race of Thessalians, the descendants of Lapithes, a son of Apollo, whose king was Pirithous, son of Ixion. They overcame the Centaurs in a bloody war, but were in turn humbled by Hercules, as related in Hesiod and Ovid. They were probably an early warlike race of the Pelasgian stock.

Laplace (lä-pläss'), Pierre Simon (Marquis de), 1749-1827; French mathematician and astronomer; b. Beaumont-en-Auge, Normandy. His parents were poor, and he was indebted to the interest of wealthy friends for admission to the College of Caen and the Military School of Beaumont. Brought to the notice of d'Alembert, who procured him the mathematical mastership of the Military School at Paris, that city became his residence at the age of eighteen. Two papers on the "Theory of Probabilities," printed at the Academy during the ensuing five or six years, are mentioned by the Academy as chosen for publication among many, with the eulogy, "This society has never known so young a person to furnish in so short a time so many important memoirs on subjects so diverse and so difficult." He was elected an associate, and, 1785, a member. His political career during the revolution and under Napoleon has been much commented on, but neither space nor adequate data allow its discussion here. Laplace is styled by Professor Forbes "a sort of exemplar or type of the highest class of mathematical natural philosophers of this, or rather the immediately preceding, age"; by Airy, "the greatest mathematician of the past age"; by Nichol, "the titanic geometer"; to which Newcomb adds that "the present age has produced no recognized rival." His more important investigations are his improvements of the lunar theory; his discovery of the cause of the great inequality of Jupiter and Saturn's motions; his theory of the tides; his work on probabilities. His longest and most systematic work, the "*Mécanique Céleste*," is a compendium of the problems of physical astronomy treated by methods mainly original with himself. His "*Exposition du système du monde*" is a résumé of all modern astronomy.

Lapland, land inhabited by the Lapps, the extreme N. portion of the Scandinavian peninsula and the European continent, bordering on the Arctic Ocean, the White Sea, and the Gulf of Bothnia, and comprised in Sweden, Norway,

Finland, and Russia; total area, est. at 153,000 sq. m., the greater part belonging to Russia; pop. abt. 102,000. The coasts are indented with numerous bays, and faced with small islands. Near the Gulf of Bothnia the surface is a plain covered chiefly with spruce and fir forests. The ground then rises, gradually terminating in rocky peaks, in some places 6,000 ft. high. There are many lakes. The principal rivers are the Tornea, Kemi, Kalix, Lulea, Pitea, Umea, Tana, and Alten. The climate is mildest on the seacoast. The mean annual temperature at Cape North is about 30° F. In winter the sun is for many weeks below the horizon, and in midsummer there are weeks of continuous day. Of the total population of Lapland, about one third are Lapps, who form a subdivision of the Finnic race. The fishermen are known as "sea Lapps" and the reindeer herdsmen as "mountain Lapps." They are very small in stature, with black, straight hair and yellow skin. They dress in furs with trousers and shoes of reindeer skin. The dwellings of the mountain Lapps are small tents. The sea Lapps have wooden huts. They live almost exclusively on animal food. The women are skillful in making garments, and the men cut utensils out of wood. They hunt chiefly with bow and arrow, but some have guns. Polygamy is not prohibited, but is rare, as wives have to be bought. The reindeer, which affords food, clothing, and means of transportation, constitutes the entire wealth of the mountain Lapps. The Lapps belong to the Lutheran Church in Norway and Sweden, and to the Greek in Russia. The Lappish language is related to Finnish, but has of late incorporated many Swedish words.

La Plata (lä plä'tä), capital of the province of Buenos Aires, Argentina; on the Río de la Plata; 24 m. below Buenos Aires, with which it is connected by railway. The Plata here forms a bay, somewhat sheltered on the side of the sea. The village of Ensenada existed previous to 1882, Tolosa being a little inland. By law of 1882, 63½ sq. m. of land, including these two places, was set apart for a provincial capital with the name of La Plata. The first stone of the new city was laid, November 19, 1882, and since then its growth has been phenomenal. A dock has been constructed, communicating with the deep channel of the Plata by a canal nearly 5 m. long, admitting vessels

of 21 ft. draught, and with ample wharves and landing facilities. These advantages have transformed La Plata into the commercial port of Buenos Aires. Pop. (1909) 95,126.

La Plata Riv'ér. See PLATA, RIO DE LA.

La Plata, Unit'ed Prov'inces of, official name until 1830 of the Argentine Republic. During a portion of this time it included Uruguay; later the strife of the federalist and centralists brought about the separation of Buenos Aires and the confederation's dissolution.

La Porte du Theil (lä pört dü täl'), François Jean Gabriel, 1742-1815; French scholar; b. Paris; received a military education, and served in the later campaigns of the Seven Years' War, but devoted all his leisure hours to the study of the Greek language and literature, and published, 1774, a translation of Æschylus's "Orestes," and, 1775, of the "Hymns" of Callimachus. In 1776-86 he resided in Rome, and having received admittance to the Vatican Library, which at that time was generally closed to foreigners, he took back to Paris nearly 18,000 documents illustrative of European history of the thirteenth and fourteenth centuries. Three volumes of these documents, containing among other things the letters of Pope Innocent III, were published, 1791; but the further publication was interrupted by the revolution, and the materials were placed in the National Library.

Lappenberg (läp'en-bërkh), Johann Martin, 1794-1865; German historian; b. Hamburg; studied in Edinburgh, London, Berlin, and Göttingen; became a lawyer, and was for many years in the diplomatic and civil service of Hamburg. Many of his historical works relate to the early history of the Hanse towns, especially Hamburg, and of N. Germany. His most remarkable work is the "History of England under Anglo-Saxon Kings."

Lap'wing, or Pee'wit, large species of plover (*Vanellus cristatus*), having a well-developed



LAPWING.

hind toe and an erect, slightly recurved, pointed crest on the head. The crown, fore throat,

upper breast, and half the tail are glossy black; the mantle deep green with a purplish gloss; the sides of the neck, under part of body, and lower half of tail are white; some of the tail coverts are rusty yellow. The lapwing is common in Europe and N. Asia, and is about as large as a pigeon.

Lara (lä'rä), state of Venezuela; formed, 1881, from a portion of Falcon; lying between Falcon, Carabobo, Zamora, Los Andes, and Zulia, with about 20 m. of coast on the Caribbean Sea, where it possesses the port of Tucacas; area, 9,296 sq. m.; pop. (1907) 277,806. Capital, Barquisimeto, united to Tucacas by rail. Lara is noted for its copper mines, the only ones worked in Venezuela.

Laramie (lä'rä-mē), capital of Albany Co., Wyo., on the Big Laramie River; 57 m. NW. of Cheyenne; is in the midst of the Laramie plains, 7,122 ft. above sea level, and has mountains rich in ores on the E. and W., and a vast plateau of agricultural and stock-raising land on the N. and S. The city is the seat of the State University, the State Agricultural College, the State Fish Hatchery, the State Penitentiary, and of the Protestant Episcopal bishopric of Wyoming and Idaho. Besides extensive railway-machine shops, there are rolling mills, tie-preserving plant, soda-reduction works, several stone quarries, glass and soap works, and flour mills. Pop. (1910) 8,237.

Laramie, river in State of Wyoming; formed by the Big and the Little Laramie, which rise in the Medicine Bow Mountains, and flow NE., skirting on the E. the plains of the same name. It enters the N. Fork of the Platte at Fort Laramie, and is much used for floating lumber from the mountains.

Laramie Group, American geological formation of transition character passing below into marine Cretaceous and above into fresh-water Tertiary terranes. It occurs along the E. border of the Rocky Mountains from central Mexico, N. through the U. S. and far into Canada, a distance of 2,000 m.; this belt was originally 500 m. broad, but has been broken into detached areas by erosion. Valuable beds of coal occur in this group; especially in New Mexico, Colorado, and Montana; the coal fields on Puget Sound have been referred provisionally to the same period.

Laramie Moun'tains, range rising at the Red Buttes, near the Sweetwater River, Wyo., and extending in a curve S. to the Arkansas River, near Long's Peak in Colorado, forming a wall which closes in the Laramie Plains to the NE. and E. This range is connected with the Big Horn Mountains and Black Hills by low anticlinals extending across the prairie, the most complete and beautiful to be found in the Rocky Mountain region. The numerous branches of the Platte rise in this range, of which the principal summit is Laramie Peak. Coal has been found in considerable quantities.

Lar'ceny, the taking and removing by trespass of personal property, knowing that it belongs to another, and for the purpose of

depriving him of such property. It was a felony at common law, and, if the value of the property stolen exceeded twelve pence (twenty-four cents), the punishment was death. This excessive penalty accounts in part for the abundant technicalities and subtle distinctions in the law of larceny, for it induced in the judges a greater anxiety to save human life than to be logical. Only personal goods are subjects of larceny. Injuries to real estate may constitute a trespass, but not theft. Even where trees, or growing crops, or precious metals, or fixtures, had been wrongfully severed and carried away, the offense was a trespass, and not theft, unless the severance and the removal were distinct transactions. Accordingly, where a person severed an article from the land and concealed it for several hours until it was convenient for him to carry it off, it was held that he had not committed larceny; for he had not abandoned the article, nor had his possession of it passed to anyone else, and his removal of the article was but a continuance of the transaction that began with the severance.

Only those chattels can be stolen in which another than the taker has a property. Hence there can be no larceny of things which are not the subjects of private ownership, or those which have been abandoned. Theft cannot be committed of wild animals while living, but theft could be committed of dead wild animals if they were fit for food. In the U. S. some courts have held that any wild animal of pecuniary value to its captors is the subject of larceny. An example of abandoned property is afforded by the case where the owner of a wornout horse turned it over to a servant, who was to kill and bury it. The servant sold it to a tanner for fifteen shillings, and the court held there was no larceny. The thief must take the property into his physical possession and control, but the length of time during which he retains it is immaterial. He must remove it, but not to any prescribed distance. Nor has he a thief's control of a coat which he seizes and carries the length of a chain that fastens it to the owner's premises; but if he lifts a purse from its place in the owner's pocket, although instantly dispossessed of it, the taking and removal are complete. It is not necessary that the thief should grasp the property. Enticement, or trick, or the agency of an innocent third party, may take the place of forcible prehension; but it is not larceny to shoot and kill another's animal, where the wrongdoer leaves it undisturbed after its fall.

A servant is not guilty of larceny who wrongfully converts his master's property to his own use before the master has become possessed of it; but he is if the taking and removal occur while the property is in the master's actual or constructive possession. If the servant is sent by the master to buy and bring an article to the latter, and makes away with it before his return, he is not guilty of larceny, for the master had not acquired possession of the article; but if having the master's carriage for the trip, he puts the article into that, it thereupon is in the master's constructive possession, and im-

mediately a felonious taking and removal becomes possible. A person may steal goods of which he is the general owner. For example, a sheriff levies an execution on the debtor's horse; the debtor thereafter sells and delivers the horse to a third person, and charges the sheriff with having disposed of the animal: the debtor is guilty of larceny.

The trespass need not be felonious when committed. If one takes another's coat, honestly supposing it to be his own, and later, on discovering his mistake, wrongfully converts it to his own use, the inadvertent trespass will suffice to make the transaction larceny.

Common law carefully distinguished larceny from false pretenses. If a person asks another to give him small bills for a large one, and upon receiving them withdraws his bill and makes off with all the money, he is guilty of larceny. Had he obtained the bills on a check which he knew to be forged, his offense would have been false pretenses, but not theft. Wherever the owner intended the property to pass to the swindler, though he would not so have intended had he known the real facts, there is no larceny, because the taking is not by trespass. When two or more persons conspire to induce another to put his money into the hands of one of the confederates, on a wager between him and the other, and the stakeholder makes off with the money, he is guilty of larceny, as well where the bet is lost to the owner by a trick of the confederates as where he wins it. A person may commit trespass in taking and removing the personal property of another, and yet not commit larceny. He may honestly believe the property is his own, or that he has a right to take it, as in satisfaction of a debt. If he is mistaken, he is liable to a civil action for the trespass, but not to a criminal prosecution for stealing. The taking of another's goods under a *bona fide*, though legally groundless, claim of right is not larcenous. One who wrongfully takes the horse of another to use for a time and to return him, converts, but does not steal him; but if one wrongfully takes railway tickets to use, though he intends to return them to the company through the conductor, he is guilty of larceny. He does not return the property that he took.

The finder of property, who, honestly believing the owner cannot be discovered, takes it with the intention to convert it to his own use, is not a thief; but he is if when taking it with such intention he had reason to believe the owner could be found. In the latter case his purpose is to deprive the owner of his property; in the former he has no such intention. This felonious intention must exist at the time of taking, unless such taking was by trespass. Hence where the finder knows the owner of lost property, and takes it, intending to restore it to him, such finder does not commit larceny by willfully converting it to his own use later.

At common law the theft of property of a value exceeding twelve pence was grand larceny, while if the property was of twelve pence or less the crime was petit larceny. The former was punishable with death, the latter by fine and imprisonment. Modern statutes have

in many jurisdictions abolished this classification; in others they have changed the limit of value separating the classes, and in all they have taken this crime out of the category of capital offenses. The common law also distinguished simple larceny from compound larceny, the latter consisting in stealing property which at the time of taking was under the protection of a person or a building. The former differs from robbery in that no force or fear is applied to the possessor prior to the taking. The latter differs from burglary in that it does not involve a breaking of a building. Both in Great Britain and the U. S. the rules governing larceny have been greatly modified by statutes, and simpler and more reasonable doctrines have been declared.

Larch, coniferous tree with deciduous leaves belonging to the genus *Larix*. The *L. europæa*, called Scotch larch in the U. S., is not a native of Great Britain, though extensively grown there. Its wood is valuable for many purposes.



AMERICAN LARCH.

In Russia, Orenburg gum, a wholly soluble and edible product, is obtained from the charred trunks of this tree, as is Briançon manna in France. The Himalaya larch is *L. griffithsii*. For the American larch, see HACKMATAACK.

Lar'com, Lucy, 1826-93; American author; b. Beverly, Mass.; edited *Our Young Folks*, of Boston, 1866-74; published "Ships in the Mist," "Wild Roses of Cape Ann," and "A New England Girlhood," an autobiography.

Lard, hog's fat extracted from the containing tissues by melting at a temperature slightly above the boiling point of water, extensively used for culinary purposes and for the manufacture of candles, illuminating oils, pomades, unguents, and soaps. The ordinary lard of commerce is obtained from the entire fat of

the animal; the best quality, known as leaf lard, is that derived from the fat which surrounds the kidneys. It is often adulterated to the extent of twenty-five per cent or more by the addition of cottonseed oil, alum, lime, mutton suet, starch, potato flour, or other farinaceous substance, while water may be employed for the same purpose up to twelve per cent. The composition of lard is sixty-two parts oleine to thirty-eight of stearine and palmitine, the former, called lard oil, being used for lubricating machinery and for illumination, while the latter is chiefly employed for the manufacture of hard candles. The manufacture of lard is an important part of the business of pork packing, and is largely carried on at the great slaughtering centers. The amount produced in wholesale packing houses alone is over 1,240,000,000 lbs. per annum, as shown by 1909 census. Lard is the chief material employed in pharmacy, in combination with vegetable balsams and oils, for the preparation of unguents and cerates, for which purpose, however, only the best quality can be advantageously used. Lard oil is exported from the U. S. in immense quantities, chiefly to France, where it is largely used for the adulteration of olive oil. The melting point of pure lard varies from 78° to 87° F.

Lard'ner, Dionysius, 1793-1859; British writer on physical science; b. Dublin; was Prof. of Astronomy and Physics in the Univ. of London; afterwards resided in the U. S., and then in Paris; chief work, the "Cabinet Cyclopaedia," 134 volumes, 1830-44; also produced an "Algebraic Geometry," a work on "Calculus," on the "Steam Engine," a series of "Handbooks" on science, the "Museum of Science and Art," and other works.

Lardner, Nathaniel, 1684-1768; English divine; b. Hawkhurst, Kent; belonged to the Presbyterian denomination, but entertained Unitarian opinions. He wrote many valuable theological works, the most important of which is his "Credibility of the Gospel History."

Lares (lā'réz), class of inferior divinities or protecting spirits in ancient Rome, domestic and public. Only the spirits of the good were honored as lares. The household lares were headed by the *lar familiaris*, who was revered as the founder of the family. The public lares were considered as the protecting spirits of the city, and had a temple in the Via Sacra. In great houses the images of the household lares had their separate apartment, called *œdicula* or *lararium*. Their worship was simple.

Laredo (lā-rā'dō), capital of Webb Co., Tex., on the Rio Grande River, opposite Nuevo Laredo, Mex., with which it is connected by two steel bridges; 153 m. W. of San Antonio. It is in the Rio Grande coal region, and has an import and export trade with Mexico. It was settled by Spaniards as a frontier town of Mexico, and on the annexation of Texas to the U. S. many of the Mexican inhabitants moved across the river and founded Nuevo Laredo. Pop. (1910) 14,855.

Laris'sa, name of eight cities of Grecian times. The chief ones were: (1) The cap-

ital city of Thessaly, on the Peneus in the province Pelasgiotis. It is still a place of importance, and bears the name Larissa, though the Turks called it Yeni Shehir. (2) Larissa Kremaste, the hanging Larissa (now Gardiki), in the S. part of Phthiotis on a high hill whose slopes are covered with gardens, hence the name. (3) The Acropolis of Argos. (4) A city on the Tigris and the greater Zab. Its ruins were described by Xenophon. These ruins now bear the name of Nimrud, and were partially excavated by Sir Austen Layard in the interest of the British Museum.

Laristan (lār-is-tān'), district of Persia, part of the provinces of Kerman and Farsistan; bordering on the Persian Gulf. It is mostly an arid, sandy waste, and the guinea worm is a perpetual plague. The pop. is abt. 90,000, partly Arabs, who live almost independently, and partly various tribes of Iranian stock speaking an archaic form of Persian. Capital, Lar.

La Rive, Charles Gaspard de, 1770-1834; Swiss chemist; b. Geneva; became president of the Royal Medical Society of Edinburgh; returned to Geneva, 1799, where he was a member of the Representative Council, and founded the Museum of Natural History, a botanic garden, and courses of lectures. He was the first on the Continent to disseminate the discoveries of Davy and other English physicists, and to construct a large galvanic battery.

Lark, popular name of several passerine birds of the group Oscines (singers). The true larks are of the family *Alaudidae*, of which the skylark of the old World (*Alauda arvensis*) is the typical spirit. This most interesting bird is a great favorite, from its sweet song, which



SKYLARK.

it sends forth while soaring aloft in clear weather. Its range extends across the Old World from the Faroe to the Kuril islands. It spends the winter in S. China, Nepal, the Punjab, Persia, Palestine, and Egypt, and the summer in central Europe and Asia. It is a fine cage bird, and is now to some extent naturalized in the U. S. The horned skylark (*Eremophila cornuta*) is one of the most familiar birds of the great W. plains of the U. S.

The shorelark (*Otocoris alpestris*) is a very sweet singer. The well-known meadow lark of the U. S. (*Sturnella magna*) is of the oriole family.

Larkspur, popular name of the herbs of the genus *Delphinium* (family *Ranunculaceæ*), which are found in the cool regions of both hemispheres. The U. S. have eight or ten native species, and Europe as many. They are reputed to be poisonous herbs; and are efficacious in the treatment of pediculosus. Several of these, together with some Asiatic species, are favorite garden flowers.



LARKSPUR.

Lar'naka, ancient *Citium*, chief port of Cyprus; has a good roadstead on the SE. coast; exports wine, oil, morocco leather, pottery, and cotton. Very attractive as beheld from the sea, it is nevertheless situated in the most bare and sterile part of the island. Pop. (1901) 7,964.

La Rochefoucauld (lā rōsh-fō-kō'), François (Duc de), Prince de Marillac, 1613-80; French author; b. Paris; was concerned in the plots against Richelieu; was imprisoned for eight days in the Bastille, 1637; lived in retirement till the cardinal's death, 1642; then returned to the court, and attached himself to the Duke d'Enghien (Condé), forming a *liaison* with his sister, the Duchess de Longueville. In the wars and intrigues of the Fronde he served the party of the Parliament, 1650, and afterwards led a life of repose and reflection. To his relations with Mme. de Longueville succeeded the friendship of Mme. de Sablé, Mme. de Sévigné, and Mme. de Lafayette; and his house became a resort of those most distinguished for wit and culture, including Boileau, Racine, and Molière. His "Mémoires" (1662) are among the most interesting records of the period. In 1665 he published "Réflexions, ou Sentences et maximes morales," a volume of 150 pages, containing 360 detached thoughts. The "Maximes" have been frequently republished.

La Rochefoucauld-Liancourt (-lā-ān-kōr'), François Alexandre Frédéric de, 1747-1827; French publicist and philanthropist; b. Paris; was President of the National Assembly, 1789; emigrated, 1792; lived in England and the U. S.; returned to France, 1799; was much in public life under the Restoration as an advocate of liberal measures; and died in Paris. He aided in introducing vaccination, inaugurated the system of dispensaries and of schools for mutual instruction, established the first savings bank in France, and opposed the slave trade. He published an account of the prisons of Philadelphia, and other works, including his American travels. Napoleon made him a peer under his hereditary title.

La Rochejaquelein (lä rōsh-zhāk-lān'), Henri du Verger (Comte de), 1772-94; French nobleman of La Vendée; joined Lescure in the first Vendean war; became one of the ablest of the royalist leaders; and on the death of Lescure was chosen to the chief command. He twice defeated the army of the National Convention around Autrain, and occupied Le Mans, La Flèche, Laval, and other cities, but was opposed by vastly superior forces, and could not retain his advantages. He was killed at the battle of Nouaillé, near Chollet. Before the fatal battle he thus addressed his soldiers: "If I retreat, kill me; if I advance, follow me; if I die, avenge me."

La Rochelle (lä rō-shëll'), town of France; capital of the department of Charente-Inférieure; on an inlet of the Atlantic formed by the islands Ré and Oléron; is fortified, well built, with handsome streets and many fine buildings, and has a large, deep, and safe harbor, a great arsenal, building-docks, extensive manufactures of glass, earthenware, iron and copper wares, sugar, and brandy, and considerable trade in wine, corn, and colonial products. In the sixteenth and seventeenth centuries it was the stronghold of the Huguenots, and played a conspicuous part during the religious wars. It was one of the free cities granted to the Huguenots by the Edict of Nantes (1598), but on the renewal of the war in Louis XIII's reign it fell into the hands of Richelieu after a long siege (1628), and its loss destroyed all power of effective resistance on the part of the Huguenots. Pop. (1900) 31,559.

Larousse (lä-rōs'), Pierre, 1817-75; French lexicographer; b. Toucy, Yvonne; became a publisher of books for primary education, writing many of them himself; began work on his great universal dictionary ("Dictionnaire du XIX^e Siècle"), 1863, surrounding himself with the best writers; but died, leaving his encyclopædia at the letter M. The work was, however, completed, and is an invaluable one.

Larra (lä-rä'), Mariano José de, 1809-37; Spanish author; b. Madrid; known under the pseudonym of "Figaro" as the most popular modern satirist, dramatist, and critic of his country; after a short career abounding in tumultuous adventure, died by his own hand at Madrid.

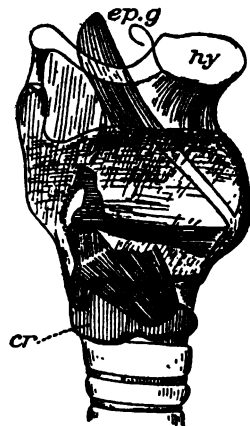
Larrey (lä-rä'), Dominique Jean (Baron), 1766-1842; French military surgeon; b. Baudéan, Hautes-Pyrénées; went to Paris, 1787; entered the navy; later joined the army; invented the ambulance volante, 1793, and was made surgeon in chief; served in Egypt, Germany, Spain; created a baron on the field of Wagram, 1809; made numerous important improvements in surgery; author of "Mémoires de médecine et de chirurgie militaire" and "Clinique chirurgicale."

Lar'va, first stage of the life of an insect, after emerging from the egg. The form is wingless, generally elongated and wormlike, known as the caterpillar, grub, or maggot, according to the order of the insect. After a

time this state passes into that of the pupa or chrysalis.

Laryngoscope (lä-rin'gō-skōp), instrument proposed and in part introduced by Robert Liston and employed by other eminent surgeons of his time; but greatly improved and first systematically used by Prof. Czermak. It is employed for examining the condition of the larynx, and also for observing the action of the vocal cords during phonation. It consists of two mirrors; the larger one, concave, throws light upon the smaller, which is held in the throat of the patient and illuminates the interior of the larynx, at the same time presenting a reversed image of the glottis, vocal cords, and surrounding parts. The laryngoscope is of great value in treating diseases of the throat.

Larynx (lä'rinks), organ of voice, situated at the upper part of the windpipe. The lower part of it is cylindrical, and scarcely wider than the windpipe, but above it widens out and forms a triangular-shaped box, attached to the hyoid bone by various muscles. It is situated in front of the œsophagus and immediately beneath the integument on the front of the neck, where it forms a projection known as the Adam's apple, which is very prominent in males. The larynx is composed of various cartilages, nine in number, the most important of which are the thyroid, cricoid, two arytenoid, and the epiglottis. It is moved by a number of muscles, and lined with mucous membrane, which in places is thrown into folds, constituting the ary-epiglottic folds, the ventricular bands, and the vocal cords.



SIDE VIEW OF THE LARYNX:
hy, hyoid; ep.g, epiglottis;
th, thyroid; cr, cricoid; a,
arytenoid.

The function of the larynx is twofold—the production of the voice, and protection to the lungs and bronchi during respiration. The manner in which the voice is produced is as follows: The vocal cords, which are stretched across the laryngeal tube, are relaxed when the voice is at rest, but as soon as there is a desire to produce a sound they are put on the stretch, and approximated by certain muscles connected with the larynx, and at the same time the air is driven forcibly through them from the lungs. The quality of the sound is regulated by the degree of tension and approximation of the cords, and the force with which the column of air is driven through the aperture. This has nothing to do with articulation, which is produced by the lips and tongue. The movements of the larynx during respiration are as follows: At each inspiration the vocal

cords are separated and the larynx freely opened, but in expiration it is partially closed by the relaxation of the vocal cords. The larynx further protects the lungs from the invasion of any foreign body. The larynx is subject to many affections, the most common of which are laryngitis, or inflammation of its lining membrane; paralysis of some of its muscles; growths on the cords; ulcerative and laryngeal tuberculosis, etc.

La Salle (lā sāl'), Jean Baptiste de, 1651-1719; French priest; b. Rheims; became a cathedral canon at Rheims when seventeen years old; received the doctorate after studying at the Sulpician School, Paris; became a priest, 1671; devoted himself to the instruction of the poor; founded the Brothers of the Christian Schools, an order which received papal approval, 1725. Numerous miracles are credited to him, and, 1840, he was declared "Venerable" by Gregory XVI.

La Salle, René Robert Cavalier (Sieur de), 1643-87; French explorer; b. Ronen; became a Jesuit, but, renouncing his profession, embarked for Canada, 1666; became a fur trader; 1669, set out to find the NW. Passage by way of the Great Lakes; explored Lake Ontario, and, 1671, discovered the Ohio; went to France, 1674; was ennobled and received important grants in Canada. Returning, 1678, from another voyage to France, he explored the Great Lakes, and attempted to colonize their shores; descended the Illinois and the Mississippi, reaching the Gulf of Mexico, April 9, 1682, and named the region Louisiana. In 1683 he went to France, and, having received a commission, endeavored, 1684, to plant a colony in Louisiana, but the voyage was disturbed by dissensions, and he landed, 1685, in Matagorda Bay, Tex., and built a fort. His followers were much reduced in numbers, and, having decided to go by land to Canada, he was murdered by his own men on the banks of a branch of Trinity River.

Las'cars, name of two celebrated Greek grammarians, who took refuge in W. Europe after the final overthrow of the Greek Empire by the Turks, and contributed very much to the introduction of the study of the Greek language, literature, and philosophy into Italy and France. **ANDREAS JOANNES**, abt. 1445-1535; b. Rhyndacus, Phrygia, whence he received the surname Rhyndacenus. He lived in Italy and France at the courts of Lorenzo de' Medici, for whom he published his celebrated "Anthologia Græca"; of Louis XII, who used him in several diplomatic missions; and of Leo X and Paul III. **CONSTANTINE LASCARIS**, d. 1493; very little is known of him. He lived mostly at the court of Francesco Sforza, in Milan, where he wrote his famous "Grammatica Græca," but he also taught in Florence and Naples.

Las'cars, Anglo-Indian name applied to non-combatant native male followers of the army in India, and also to native seagoing crews on British ships.

Las Casas (lās kă'sās), Bartolomé de. See **CASAS**.

Las Cases (lās kīlz'), Emmanuel Augustin Dieudonné Marie Joseph (Marquis de), 1766-1842; French military officer; b. Las Cases, Languedoc; entered the navy; emigrated, 1791; served for some time in the army of the Prince of Condé; later resided in London, where he published his "Atlas historique," 1803; returned to France, 1805, and held several offices in the civil and military service during the Empire, and accompanied Napoleon to St. Helena, 1815. A letter to Lucien Bonaparte (November 27, 1816), in which he spoke freely of the manner in which Napoleon was treated, caused him to be arrested and transferred to the Cape of Good Hope. After thirteen months' imprisonment he was liberated; settled in Belgium, but returned to France after the death of Napoleon. In 1824 he published his "Mémorial de Sainte-Hélène," containing a record of the remarks which Napoleon had made to him in their conversations.

La Serena (lā sā-rā'nā), Chile. See **COQUIMBO**.

Laaker (lās'kér), Eduard, 1829-84; Prussian statesman, of Jewish parentage; b. Jarocin, Posen; became known by his work on the "Constitutional History of Prussia"; was one of the founders of the National Liberal party and a promoter of the union of the S. and N. states of Germany; first entered the Prussian Chamber, 1865; became prominent in the N. German and German imperial parliaments; was the foremost leader in the Reichstag and supporter of Bismarck till 1880, when he withdrew from the party; other works, "Future of the German Empire" and "Ways and Means of Cultural Development"; d. in New York.

Las Palmas (lās pāl'mās) (Spanish, "the palms"), town on the NE. coast of Gran Canaria, one of the Canary Islands. It is beautifully situated at the feet of lofty hills, with a spacious and good harbor. It is also well built, with a fine old cathedral and beautiful promenades. It has manufactures of glass, leather, woollens, and hats. Pop. (1900) 44,517.

Lassa (lās'sā), capital of Tibet; in a plain on the Kichu, a tributary of the Brahmaputra, 11,580 ft. above the sea; encircled by lofty, barren mountains; is a well-built town, with broad and regular streets, and a population estimated at from 15,000 to 20,000 (nearly half of whom are Buddhist monks), and an extensive trade in precious stones, gold, velvet, silk, and cashmere. On the top of a hill adjoining the city is the Potala or palace of the Dalai Lama, the head of the Buddhist hierarchy of Tibet and Mongolia. It forms "a group of fortifications, temples, monasteries, and schools, surmounted by a dome entirely covered with gilded plates, and surrounded by a peristyle of gilded columns." Thousands of pilgrims annually visit it; hundreds of them stay there to complete their theological and philosophical education; and all of them leave behind them a present to the Dalai Lama. Besides the Potala, the city contains many temples, convents, and schools, and the life of the city in all its phases is deeply colored with religious rites and symbols.

Lassalle (lä-säl'), **Ferdinand**, 1825-64; German Socialist; b. Breslau; published several philosophical works; turned his attention to politics, 1862; became a social agitator of great influence; was the founder of the German Social Democracy; works include "The System of Acquired Rights," "Workingmen's Programme" (for which he was imprisoned), "Science and the Workingmen," and "Indirect Taxation and the Condition of the Laboring Classes."

Lassen (läs'en), **Christian**, 1800-76; Norwegian Orientalist; b. Bergen; first attracted attention by his "Essai sur le Palé," written in connection with Burnouf, and his edition of "Hitopadesa," a collection of Indian fables, made in connection with A. W. Schlegel; became Prof. in Indian Languages at the Univ. of Bonn, 1830. By his critical editions of "Institutiones linguae Praeriticae," "Anthologia Sanscrita," etc., and his numerous linguistic, archaeological, and historical writings he became the founder of the study of Indian language, literature, and history in Europe. His principal work was his "Indische Alterthumskunde."

Lassen, Eduard, 1830- ; Danish composer and conductor; b. Copenhagen; took many prizes in the Conservatory, including the great government prize, 1851; composed a five-act opera, "Le Roi Edgard," which was produced, 1857, at Weimar by Liszt with great success. This was followed by "Frauenlob" and "Der Gefangene." He succeeded Liszt as director of the opera at Weimar, and produced Wagner's "Tristan und Isolde," 1874. He composed two symphonies, music to Goethe's "Faust," and "Pandora," Sophocles's "Oedipus," Hebbel's "Nibelungen," a fest-cantata, a Te Deum, a violin concerto, and many songs.

Lassen's (läs'enz) **Peak**, mountain of Shasta Co., Cal.; at the N. end of the Sierra Nevada; is of volcanic origin, and has an altitude of 10,437 ft.

Lasso (läs'ö), **Orlando di**, or **Orlandus Lassus**, 1520-64; Flemish composer; b. Mons; lived in Antwerp and Munich; and was one of the most famous composers of the age, excelling in harmony, and being one of the first to attempt chromatic passages. He composed songs and sacred music. His works were published in Paris under the titles "Mélanges d'Orland Lassus" and "Continuation des Mélanges."

Lat'eran, name of a place in Rome occupying the site of the estates of the ancient Roman family Lateranus. The two principal buildings in the place are the Church of S. Giovanni and the palace. The old Lateran Palace became imperial property under Nero, who put Plautius Lateranus to death and confiscated his estates. Constantine the Great presented it to the pope, and it was the pontifical residence until, 1309, the Holy See was transferred to Avignon. On the return of Gregory XI to Rome, 1377, he took up his residence in the Vatican. Having been burned down under the reign of Clement X, the Lateran Palace was rebuilt, 1558, under Sixtus V, but it remained unoccupied until Innocent XII, 1693, made it

an orphan asylum. In 1843 Gregory XVI established here the Museum Gregorianum Lateranense for antiquities, the Vatican and Capitoline museums affording no more space. The church S. Giovanni in Laterano was founded by Constantine the Great, overthrown by an earthquake, 896; rebuilt by Sergius III, 904-11; burned down, 1308; restored by Clement V, and subsequently much altered and modernized by Martin V, 1430; Pius IV, 1560; Borromini, 1650, and Galileo, 1734. For centuries it was the principal church in Christendom.

Lateran Councils, councils so called because they were held in the Church of S. Giovanni (St. John) Lateran in Rome. They comprise, besides six minor, five great ecumenical councils, namely: (1) That convened by Calixtus II, and opened March 18, 1123, by which the long strife between the popes and the German emperors concerning investiture was ended on the following terms: "The emperor surrenders to God, to SS. Peter and Paul, and to the Catholic Church all right of investiture by ring and staff. . . . The pope agrees that the election of German prelates shall be had in the presence of the emperor, provided it is without violence or simony." (2) That convened by Innocent II, and opened April 20, 1139, by which the antipope, Anacletus II, and all who had received office under him, were deposed. (3) That convened by Alexander III, and opened March 2, 1179, by which it was established that henceforth "the election of the popes shall be confined to the college of cardinals, and two thirds of the votes shall be required to make a lawful election, instead of a majority only, as heretofore." (4) That convened by Innocent III, and opened November 11, 1215, by which a crusade was determined on for the liberation of Palestine from the infidels, the heresy of the Waldenses was condemned, and the expression "transubstantiation" was sanctioned by the Church. (5) That convened by Julius II, and opened May 3, 1512, by which the acts of the Council of Pisa were annulled, and the concordat concluded, 1516, between Francis I and Leo X, who succeeded Julius II, and closed the council, 1517, was substituted for the Pragmatic Sanction of Bourges.

La'tex, scientific name for the thick, milky juice of certain plants, as the milkweed, celandine, etc. It is distinct from the true sap, and is contained in a set of tubes called laticiferous vessels. Many important vegetable products, such as opium and caoutchouc, are the dried latex of some one or more species of plants.

La'tham, **John**, 1740-1837; English ornithologist; b. Eltham, Kent; established himself, 1763, as a physician at Dartford; aided Sir A. Lever in forming his museum, and was one of the founders of the Royal Society and of the Linnean Society. Besides papers on medicine and natural history, he was the author of a "General Synopsis of Birds," eight volumes, 1781-1801, and of an "Index Ornithologicus," 1791, both which were combined in a new edition under the title, "A General History of Birds," ten volumes, 1821-24.

Latham, Robert Gordon, 1812-88; English philologist and ethnologist; b. Billingsborough, Lincolnshire; became Prof. of English Literature in Univ. College, London, 1841; publications include "Norway and the Norwegians," "History of the English Language," "Natural History of Man," "Man and his Migrations," "Ethnology of Europe," "Native Races of the Russian Empire," "Varieties of the Human Species," "Comparative Philology," and "Outlines of General Philology."

Lathe (lāth), a machine for shaping materials by turning. The material to be shaped is sustained by two centers, between which it is given a motion of revolution, while a turning tool, held by the workman or by a tool holder



FIG. 1.

attached to and moved by a slide rest, cuts away the exterior, and gives the mass the form required. Crude lathes were used in Europe at a very early period. Fig. 1 represents such a tool. The workman selects two trees growing side by side. Two maple cones *bb* inserted in the trees serve as centers, and the

block *a* to be turned is fixed between them, the end being first trimmed to cylindrical shape to take the bight of the rope, one end of which is attached to the end of the sapling and the other to the treadle seen below. The cross



FIG. 2.—SCREW-CUTTING ENGINE-LATHE, WITH FOOT MOTION.

bar *d* is a rest to support the turning tool. Lathes were adapted to other than cylindrical forms of revolution in comparatively modern times.

The foot lathe is driven by the foot of the

workman operating a treadle beneath. When the tool is larger, it is driven by steam or water power, and is called a power lathe. Fig. 2 shows a complete foot lathe. A horizontal shaft, extending beneath the bed of the lathe from end to end, carries a pulley balance wheel, which by means of a belt not shown drives the spindle which runs in bearings in



FIG. 3.—JEWELER'S LATHE.

the head of the lathe at the left. This driving shaft is turned by a treadle which is worked by the foot of the turner. The slide rest, seen at the middle of the lathe between the two heads, is moved either by hand, or automatically, by a small shaft running from end to end of the lathe, and partly concealed by that portion of the slide rest which carries the handle for attaching and detaching it. The tool is shown in its place in the tool holder, which is mounted upon and carried by the slide rest. A jeweler's lathe is shown in Fig. 3. A good lathe must be capable of turning a truly cylindrical surface, and of producing a perfectly plane face upon the end of the cylinder. Lathes used in screw cutting are driven by an arrangement of belting which permits them to be turned in either direction at pleasure. Lathe tools are usually of the finest crucible carbon steel. The self-hardening steels sometimes employed are commonly alloys of iron and chrome, tungsten, or manganese. They permit heavier cuts and higher speeds, and reduce costs of turning very considerably. Tools of chilled cast iron are sometimes used.

Lat'imer, Hugh, abt. 1485-1555; English prelate and martyr; b. Thurcaston, Leicestershire; in 1516 became Greek professor at Cambridge; ordained a priest at Lincoln; was dismissed from the university as a heretic by Wolsey, 1527; became chaplain to Henry VIII, 1530; rector of West Kingston, Wilts, 1531; was excommunicated, but absolved on his submission, 1532; chaplain to Anne Boleyn, 1534. He became Bishop of Worcester, 1535; resigned, 1539, not being able to accept the Six Articles, and was imprisoned in the keeping of the Bishop of Chichester; was afterwards

silenced by authority, and shut up in the Tower, 1546-47; preacher to Edward VI, 1549-50; was imprisoned in the Tower by proclamation of Queen Mary, 1553; transferred to the Bocardo of Oxford, with Ridley, 1554; burned at the stake with Ridley in the ditch near Balliol College. Latimer was one of the most influential and fearless of the English Reformers, and his admirable "Sermons" are models of forcible and witty speech.

Lat'in Church, that portion—the Western—of the Roman Catholic Church which retains the use of the Latin language in its church service; so called to distinguish it both from the schismatical Greek Church and from that other portion of the Roman Catholic Church which uses the Greek language in its liturgy. These are called United Greeks, and acknowledge the supremacy of the pope, in the same sense as those of the Latin rite.

Latin Em'pire, empire formed at Constantinople, 1204, by the crusaders under Baldwin IV, Count of Flanders, and Boniface II, Marquis of Montferrat. Turning aside from their original purpose of invading the Holy Land, they interfered in a dynastic quarrel in the Eastern Empire, and finally placed Baldwin on the throne. The rule of the Latins thus established was overthrown, 1261. See **BYZANTINE EMPIRE**.

Latini (lā-tī'nī), originally the name borne by the inhabitants of Latium associated in the Latin League. After the dissolution of the league, 340 B.C., and the annexation to Rome of a number of the communities which had formed it, the name continued to be borne by the former members of the league which had maintained their independence, and was extended to inhabitants of Italian communities which were granted the same advantages over the other Roman allies, in their relation to Rome, as the members of the Latin League had enjoyed.

Latini (lā-tē'nē), Brunetto, d. abt. 1294; Italian writer; b. Florence; was a Guelph in politics, and was obliged to live in exile for some years, probably in Paris; was prothonotary of the vicar general of Charles d'Anjou in Tuscany, 1269, and in the same capacity at Pisa, 1270; held many important offices in Florence, and took part in the deliberations of its governing bodies. His chief works that have come down to us are "Il Tesoro" (commonly known as "Il Tesoretto"), a poem describing an imaginary journey through the realms of Nature, Virtue, and Love, and "Li Livres dore Trésor," a vast encyclopedia of the history and science of the time.

Lat'in Lan'guage, originally the language of the Latins, inhabitants of the district of W. Italy known as Latium, the leading city of which was Rome. During the republican period of Roman history the Latin language remained practically confined to its original home, but with the inauguration of the imperial system it extended rapidly to the provinces, and soon became—at least in the cities and large towns—the language of the entire Roman Empire. The theory that Latin is historically related to

Greek is unsupported, and so far as Latin has a definite historical relationship with any one division of the Indo-European family it is with the Celtic group.

The oldest Latin alphabet consisted of twenty-one letters, *a, b, c, d, e, f, g, h, i* (both vowel and consonant), *k, l, m, n, o, p, q, r, s, t, u* (both vowel and consonant), *x*. These characters were borrowed from the Greek alphabet of the Chalcidian colonies of lower Italy and Sicily.

The Latin accent was essentially a stress accent, and not musical like the Greek. In the historical period the following principles for its position prevailed: 1. The accent was strictly limited to the last three syllables of a word. 2. Polysyllables were never accented upon the last syllable. 3. The accent stood upon the next to the last syllable, if that was long; otherwise upon the syllable preceding. Latin recognizes only six cases in the regular declension of nouns: Nominative, genitive, dative, accusative, vocative, ablative. For verbs it recognizes two voices, the active and passive—the latter distinguished by the peculiar endings in *-r*. The passive is really a development from the middle; it originally represented the subject as acting upon itself or in its own interest. Latin has an indicative, subjunctive, and imperative mood, although these do not always represent corresponding Indo-European formations. Latin also has an infinitive, which is in origin a verbal noun in the dative or locative case. There are two verbal nouns (gerund and supine), and four participles. There are six tenses: the present, imperfect, future, perfect, pluperfect, future perfect. Of these the pluperfect, indicative, and subjunctive are new creations of the Latin, being really aorist formations.

Latin syntax at all periods, in conformity with the prevalent tendency of the language, was much less free than Greek; at the same time its modes of expression were logically more correct. In the cases, the prominent rôle played by the ablative is especially noteworthy. The use of cases with prepositions is somewhat restricted in Latin as compared with Greek. Neither the genitive nor dative is construed with prepositions, and but few govern the ablative. The wide employment and manifold uses of the subjunctive constitute one of the most characteristic features of Latin syntax. One of the most significant features of the Latin vocabulary is the great number of Greek words which it has admitted—a natural result of Rome's great indebtedness to the Hellenic civilization.

As compared with Greek, Latin practically presents no dialectic variations. In its earlier stages the only dialectic differences were those existing between the literary language and the language of common life, *sermo cottidianus*. The distinction between these two began to exist as soon as there was a literature, and was early recognized by the Romans themselves. Beginning with the days of Plautus and Terence the divergence between them became more and more pronounced with successive centuries until it culminated, in the latest period of the language, in the establish-

ment of two independent idioms—the literary language and the *lingua rustica*, or the language of the people. The former of these remained the possession of scholars and the Church; the latter developed into the Romance, assuming a different character in the different provinces, Gaul, Spain, etc., and ultimately forming the modern French, Italian, Spanish, Portuguese, etc. Our sources of knowledge of the popular language are inscriptions and the later writers, particularly from the third century on. An earlier source of great value is Petronius's "Satiricon" (60 A.D.). Earlier still we find scattered specimens of the popular language in the comedians and the satirists.

Latin Literature. Four periods may be distinguished in the development of Latin literature. The first period lasts from earliest times to 240 B.C. Only scanty remains of the literature of this time have descended to us. Among these the Salian songs, the "Annales Maximi," named by Quintilian as the beginning of Latin prose, the clan registers, the books of oracles, and the Alban and Roman calendars, are of great antiquity. The law of the twelve tables dates from abt. 450 B.C.

The second period begins with Livius Andronicus, who transplanted Greek literature to Rome, by causing the representation of a drama, and translating the "Odyssey." The events of the second Punic War created a desire for historical writings, which the contemporary Fabius Pictor and Cincius Alimentus attempted to satisfy, writing chiefly in Greek. The master of Latin prose of this period was the elder Cato. In Cato's time appeared the father of Latin poetry, Quintus Ennius (d. 169 B.C.), who abandoned the Saturnian meter, and introduced the rhythms developed by the Greeks. Cæcilius Statius (d. 168 B.C.) and Mæcius Plautus, profiting by his lessons, introduced into their imitation of Grecian comedies the language, thoughts, and manners of the plebeians. In 166 B.C. was represented the first drama of Terence, whose imitations of Menander were rather exact and measured, but his dialogues manifested good taste, and his language was perfectly exemplary and very spirited. Lucilius (abt. 120 B.C.) created a new form of popular poetry—satires. Attius (or Accius) elevated Roman tragedy. The Ciceronian age was not productive of equally excellent works of poetry and prose. The only truly poetic mind was Lucretius. Catullus is best known for his exquisite lyrics, elegies, and epigrams. The universally informed Terentius Varro was probably the greatest savant of antiquity. The fragments of Cornelius Nepos (abt. 54 B.C.) are written in a simple style and a sober tone. Cæsar's "Commentaries" are among the proudest monuments of Latin literature. But the most clear-sighted and artistic Roman historian was Sallust (abt. 45 B.C.). The master in eloquence and in philosophical composition was undoubtedly Cicero.

The Augustan age, beginning 30 B.C., thirteen years after Cicero's death, presents a great contrast. Augustus, though himself hardly a literary person, did everything in his power

to further literary pursuits. Jurisprudence, grammar, and rhetoric now received more careful cultivation. But the glory of the Augustan age was its poetry. The poets were assiduous students of Greek art, and their poems are in a measure marked by Grecisms and imitations. This age produced every class of poetry, from the epic to the poetic epistle and the didactic poem, in equal perfection. The polished elegies of Tibullus celebrate his loves and his short martial experiences in Gaul. Propertius abounded in rich imageries; Vergil's classic phraseology remained the standard for five centuries; Ovid excelled in happy narratives; and Horace was a model of purity in language. While poetry was at high tide, historical prose was at ebb, though Livy's history of Rome has been universally recognized as a classical production.

The third period of Latin literature, from 14 to 180 A.D., has long borne the title of the Silver Latinity. Despotism, beginning with Tiberius, burdened the Roman mind until the death of Domitian. Poetry suffered the most. During the twenty-three years of the reign of Tiberius, besides Manilius, Phædrus, the writer of fables, is the sole poet. Rhetoric also slowly sank from the height it had attained. During the reigns of Caligula, Claudius, and Nero, the chief author was Annæus Seneca, who wrote philosophy and tragedies. A fertile writer in prose and verse was Annæus Lucanus (Lucan), the author of "Pharsalia," an unfinished epic on the civil war between Pompey and Cæsar. It is believed that during Nero's reign appeared the character novel "Satiricon," ascribed to Petronius Arbiter; it is important as representing the manners and language especially of the plebeians in that age. Under Vespasian and Titus flourished Pliny the Elder, whose cyclopedia of natural science has come down to us. Among the poets of this time is Valerius Flaccus. Martial left fifteen books of epigrams. The most prominent prose author of this age is Quintilian, the writer on oratory.

Between 96 and 117, under Nerva and Trajan, literature, though greatly on the decline, gained a large number of writers in all departments. The most noted poet was Juvenal, whose satires vividly describe the vices of Roman society. The most prominent prose writer is Tacitus, who as a historian followed the best sources, sifting them with strict criticism, and only indicating his own views. The literary activity of Pliny the Younger consisted chiefly in the writing of letters for publication, extending over a studied variety and over a large number of subjects. Under Hadrian (117-138) the most important literary character is Suetonius. His "Viri Illustres" and "Lives of the Twelve Emperors" are inaccurate in chronology. Annæus Florus wrote an abridgment of Roman history down to Augustus, which is rhetorical and inaccurate. Justinus, the historical writer, may have lived about this time. The excellent reign of Antoninus Pius did not prevent a further decline of Latin literature. Fronto, a man wanting in genius and taste, was the highest authority. The most famous of the numerous works of the jurist Gaius, the "Res Cotidianæ" and the "Institu-

tiones," are exceedingly graceful, lively, and natural; the latter served as the foundation of Justinian's "Institutiones." The poetical productions of this age are insignificant, unless the "Pervigilium Veneris" and the jocular epic called "Vespa" were composed in it. The literature of the reign of Marcus Aurelius (161-180) remained under the influence of Fronto and his pupils, Victorinus, Silanus, and Festus. The twenty books of "Noctes Atticæ," by Aulus Gellius, are important for many departments of literature and the knowledge of this time. The Platonic philosopher and rhetorician Apuleius possessed great originality, facility, and vivacity. The jurist Sævola wrote forty books of "Digesta," which were most used in the Pandects.

The fourth period of Latin literature extends from 180 to 500, and is one of dissolution. During the time from the accession of Commodus to the death of Septimius Severus (180-211) the Christian religion gained ground even among the educated, and was defended by the eloquent Minucius Felix and Tertullian. The great jurist Papinian is distinguished for lucidity, and the most important of his works, the "Quæstiones and Responsa," were much used in Justinian's collections. Among jurists of the first half of the third century is Ulpian, probably the most important. Three grammarians of this time enjoy some celebrity, viz., Julius Romanus, Juba, and Censorinus. Marius Maximus wrote at length the biographies of the emperors subsequent to Nerva, but without attention to truth. The works of St. Cyprian are partly of an apologetic and partly of a practical and hortatory character. Among writers in verse were Alfius Avitus and Marianus, the author of an extant lexical work.

With Diocletian (283-305) came the panegyric orators, who devoted their eloquence to the superhuman virtues and performances of the emperors. Gaul was now the chief home of this art. An "Ars Grammatica" was written by Marius Plotius Sacerdos; a metrical manual by Terentianus of Mauritania; and seven books in defense of his conversion to Christianity by the rhetorician Arnobius, the teacher in eloquence of the famous Lactantius, who surpasses all other Christian writers in the purity and elegance of his diction. The removal of the imperial residence to Constantinople imposed a new character on the literature of the fourth century. This is the epoch of the greatest brilliancy in the literature of the Christian religion. Jurisprudence was exclusively devoted to collecting and epitomizing. Grammatical studies were now prosecuted without pretense to historical investigation and scholarship. About the middle of the fourth century lived Donatus, the author of several valuable works on grammar, and of commentaries on Terence and Vergil.

The Christian hymns of Damasus (d. 384) are among the earliest which have come down to us. To this time may be assigned also the earliest Latin translation of the Bible "Itala," and Pelagius's translation. From the reign of Theodosius I polytheism became gradually extinct; Symmachus and Ammianus Marcellinus were its last representatives in litera-

ture. The latter wrote a continuation of Tacitus in thirty-one books. The number and importance of the Christian writers were daily increasing. Above all stands St. Ambrose, whose hymns became very famous. St. Jerome, the most learned Christian writer, interpreted and translated the books of the Bible, and wrote an enlarged version of the chronicles of Eusebius and the "Viri Illustres," a history of Christian literature. Prudentius wrote poems on Christian subjects, and not long after him Sulpicius Severus and Orosius treated history from the Christian point of view. Claudian (Claudius Claudianus) was the most important heathen author at the close of the fourth and the beginning of the fifth century. St. Augustine (d. 430) is the most conspicuous intellect of this time. Early in the fifth century lived also the Briton Pelagius, founder of Pelagianism, his young friend Cælestius, the translator Anianus, and, among other Christian writers, Helvidius and Innocentius. Macrobius wrote a commentary on Cicero's dream of Scipio, and seven books of Saturnalia. At the same time, perhaps, Arianus composed his forty-two Æsopian fables in elegiac meter. Martianus Capella wrote a pedantic encyclopedia of the seven liberal arts. The ruling nations were now barbarians, and through their influence literary productions with the exception of religious writing gradually ceased.

Latin Union, international monetary association formed by the Treaty of 1865, between France, Switzerland, Italy, and Belgium; Greece and Roumania afterwards became members. By the terms of the treaty the coinage of gold and of five-franc silver pieces of full legal-tender value was unlimited at the ratio of 15½ kilogrammes of silver to a kilogramme of gold. All other silver coins were to be coined on government account, and made subsidiary. While silver was redeemable in gold, the chief object of the union was to establish an identical coinage to be taken as legal tender in each country, and the introduction of bimetallism was only incidental. On account of the depreciation of silver the coinage of the five-franc silver pieces was limited, 1874, and suspended, 1876. In the subsequent conferences of the union other important modifications were made in the treaty, which was renewed, 1885, by France, Italy, Greece, and Switzerland for five years, and has since been renewed.

Lat'nus, King of Latium; according to the common tradition, a son of Faunus and the nymph Marica, and the father of Lavinia, whom he gave in marriage to Æneas.

Lat'itude, on the surface of the earth, the distance of a point N. or S. from the equator; is equal to the angle which a plumb line at that place makes with the plane of the earth's equator, or to the angle which the horizon plane of the place makes with the earth's axis. Hence, it may be measured by measuring the altitude of the pole of the heavens above the horizon, or by measuring the distance on the meridian of the equator from the zenith. The latitude of a heavenly body is its distance from

the ecliptic, and is measured by the arc of a great circle perpendicular to the latter, intercepted between the ecliptic and the body. The heliocentric latitude of a planet is its distance from the ecliptic, such as it would appear from the sun.

Latitudinarians, name given specially to certain theologians of the Anglican Church, in the latter part of the seventeenth century, who admitted a greater latitude of doctrine than was allowed either by Puritans or churchmen. Most of them were connected with the Univ. of Cambridge. Among the more distinguished of them were Henry More, Cudworth, Chillingworth, Hales, Wilkins, Gale, and Tillotson. The modern Broad Church Party is sometimes called Latitudinarian, and the term is extended to any sect or party not holding to a rigid construction of its tenets.

Latium (lă'shi-tūm), region of Italy lying between the Apennines, the Tiber, and the Mediterranean, and eventually stretching to the S. as far as the Liris, the boundary of Campania. By neglect of the watercourses a large portion of S. Latium had even in antiquity become transformed into vast marshes, while the region about Rome, the so-called Campagna, which in antiquity was the most fertile part of Italy, became a barren and unhealthful waste for the same reason. See **LATINI**.

Lato'na. See **LETO**.

Latour d'Auvergne (lă-tôr' dō-vărf'), Théophile Malo Corret de, 1743-1800; French military officer; b. Carhaix, Brittany; fought with brilliant success in the republican armies of the Alps and the Pyrenees, and became the commander of a vanguard of 8,000 men, composed of grenadiers, which became famous as the Infernal Column. In 1795 he retired from service on account of ill health, and making a sea voyage he was taken by a British cruiser and held as a prisoner of war till 1797. He reentered the army as a substitute for the last son of one of his friends; fought under Masséna in Switzerland, and then at the head of his own company in Germany, where he fell at Oberhausen, Bavaria. After death his heart was embalmed and carried in a silver vase by his company, and his name called at roll till 1814, the oldest sergeant answering, "Died on the field of honor."

La Trappe (lă trăp'), retired valley in the department of Orne, Normandy, France; 8 m. N. of Mortagne. Here, 1140, a Cistercian abbey was founded with very severe rules, from which originated the celebrated religious order known as the Trappists.

Latreille (lă-trăil'), Pierre André, 1762-1833; French naturalist; b. Brives, Corrèze; became superintendent of the entomological division of the Museum of Natural History, Paris, 1798; member of the Academy of Sciences, 1814, and Prof. of Zoölogy after the death of Lamarck, 1829. His works include "The Natural History of Crustaceans and Insects," "Genera of Crustaceans and Insects," "The Natural History of Ants," "Course in Entomology." He also wrote parts of Buffon's "Natural History."

Latrobe (lă-trōb'), Benjamin Henry, abt. 1765-1820; American architect and engineer; b. Yorkshire, England; served in the Prussian army, 1785; became surveyor of public offices of London, 1788; removed to the U. S., 1796; built the Bank of Pennsylvania, the Schuylkill water works, the cathedral and exchange at Baltimore, completed the Capitol of the U. S., and began the work of rebuilding it after its destruction by the British, 1814; built steamboats at Pittsburg in the same year.

Lat'ter-Day Saints. See **MORMONS**.

Laube (low'bēh), Heinrich, 1806-84; German man journalist and dramatist; b. Sprottan, Silesia; edited after 1832 in Leipzig a journal in which he defended the revolutionary ideas of "Young Germany," and took part in revolutionary movements, for which he was imprisoned for a time. He was appointed, 1849, director of the Burgtheater of Vienna; in 1867-70 occupied a similar position at the Leipzig Stadtheater; in 1871-79 conducted at Vienna a new theater, founded by him. His dramas include "Prince Frederick," "Monaldeschi," "Demetrius." He also wrote "The First German Parliament," "The Countess Chateaubriand," a romance, and other works.

Laud (lad), William, 1573-1645; English prelate; b. Reading, Berkshire; received clerical orders, 1601; 1611, became president of St. John's College, Oxford, and one of the royal chaplains; 1621, Bishop of St. David's; 1624, a member of the Court of High Commission; 1626, Bishop of Bath and Wells; 1627, a privy counselor; and, 1628, Bishop of London. He was the confidential adviser of Charles I in ecclesiastical affairs, and began to play a foremost part in politics. His first object was to force the Puritans and other dissenters to conformity. To secure this end, every part of the country was subjected to espionage, and even the devotions of private families did not escape his vigilance. He became Chancellor of Oxford, 1630, and was present, 1633, at the coronation of the king in Scotland, urging the forced establishment of episcopacy and uniformity in that country, which resulted in revolt and the adoption of the National Covenant. On his return he was made Archbishop of Canterbury, and enforced an exact observance of the rubric and a uniform discipline in the cathedral churches. He became one of the committee of trade and the king's revenue, 1634; a commissioner of the treasury soon after, and a censor of the press under a decree of the Star Chamber, 1637. Immediately after the meeting of the Long Parliament, 1640, he was impeached for high treason and committed to the Tower. After an imprisonment of more than three years, he was brought to trial, and condemned and executed by a sentence that is now admitted to have been unjust and illegal. His "Diary" and his letters are of great historical interest.

Laudanum (lă'dā-nūm), the tincture of opium, made by percolating the dried and powdered drug in alcohol; is a valuable opiate, though of variable strength. It has a more stimulant and astringent effect than morphine.

Lauderdale', John Maitland (Duke of), 1616-82; Scottish statesman; b. Lethington; educated as a rigorous Covenanter; was commissioned to treat with Charles I in his prison in the Isle of Wight, and obtain the signature of the treaty known as the "Engagement," 1647, by which the king was again recognized in Scotland; was taken prisoner at the battle of Worcester, 1651, and remained nine years in the Tower and other prisons. He was made Secretary of State and High Commissioner in Scotland by Charles II, 1660; created Duke of Lauderdale, 1672; raised to the English peerage, 1674, as Earl Guilford; and sworn to the privy council, forming a member of the celebrated *Cabal* ministry.

Laudon (low'dŏn), **Gideon Ernst** (Baron von), 1716-90; Austrian military officer; of Scottish descent; b. Trotzen, Livonia; entered the Russian military service, 1730, but was dismissed after the Peace of Belgrade, 1739, with the rank of lieutenant; then went to Vienna, and fought in the Bavarian and in the second Silesian War with distinction. In the first year of the Seven Years' War he distinguished himself as colonel of a regiment of Uhlans, and, 1757, was made a general. At Kunersdorf, August 12, 1759, he turned the victory which the Prussians had gained over the Russians into a complete rout of the Prussian army. Having been made a field marshal, he defeated the Prussians once more at Lands-hut, June 23, 1760, and took Schweidnitz, October 1, 1761. Joseph II placed him in command of the whole Austrian army in the war against the Turks. The campaign was a most brilliant one; the Turks were repeatedly defeated and Belgrade was taken. In the Bavarian war of succession he commanded the Austrian army.

Laugh'ing Gas. See NITROUS OXIDE.

Laughing Jack'ass. See DACELO.

Laugier (lô-zhê-â'), **Auguste Ernest Paul**, 1812-72; French astronomer; b. Paris; obtained a post in the observatory at Paris; made important discoveries in regard to magnetism, comets, eclipses, meteors, and solar spots; made improvements in astronomical clocks; determined the exact latitude of the Paris observatory, correcting previous errors; published a catalogue of fifty-three nebulae, and another of the declination of 140 stars, and contributed astronomical papers to the *Connaissance du Temps*. He was long associated with Arago in researches on terrestrial physics, and was for some years president of the Academy of Sciences.

Laurel (lâ'rêl), name properly belonging to the *Laurus nobilis* or bay tree of Europe, Asia, and Africa. In the warmer parts of Europe it becomes a large tree. Its essential oil is employed in perfumery; its flowers afford rich bee pasture; its leaves were the material of the laurel crown of victors in war and of successful poets and artists. The name is often loosely extended to all the *Lauraceæ*, to which this tree belongs. Shrubs of the genus *Kalmia* are called laurels in the U. S. Some

of the larger rhododendrons of the U. S. are called mountain laurels. The evergreen cherry trees are called cherry laurel. Several kinds of magnolia are known locally in the U. S. as laurel trees. In England the *Daphne laureola* is called spurge laurel. It is a handsome Eu-



MOUNTAIN LAUREL.

ropean evergreen shrub, sometimes planted in the U. S., and is of the family *Thymelæaceæ*. Among the ancients the laurel found many symbolical and superstitious applications. It was a sign of truce, like the olive branch, and it was a sign of victory. It was believed that lightning could not strike it.

Laurence, Richard, 1760-1838; English prelate; b. Bath; was appointed to the rectory of Mersham, Kent, 1805; became Regius Prof. of Hebrew and canon of Christ Church, Oxford, 1814; Archbishop of Cashel, Ireland, 1822. Archbishop Laurence was one of the restorers of Oriental studies in England, and perhaps the only high dignitary of his times who made a study of the dialects of the Semitic languages. His most important service to theology was the recovery from Ethiopic manuscripts of several interesting apocryphal works, often quoted by the early fathers, but supposed to have been lost. These were the "Ascension of the Prophet Isaiah," edited with Latin and English versions in 1819, and "The Book of Enoch the Prophet."

Laurens (lâ'rêns), **Henry**, 1724-92; American statesman; b. Charleston, S. C.; served as a major against the Cherokees; became, 1775, member of the S. Carolina Congress, and president of the Council of Safety; 1776, was sent to the Continental Congress, of which he was president, 1777-78; 1779, sailed as U. S. Minister to the Netherlands, but was made a prisoner by the British while at sea, and kept a close prisoner in the Tower for fifteen months; 1781, was released, and appointed by Congress one of the commissioners to negotiate a peace, with Franklin and Jay as his colleagues.

Laurens (lô-rân'), Jean Paul, 1838- ; French historical painter; b. Fourquevaux, Haute-Garonne; studio in Paris; awarded a first-class medal at the Salon of 1872; medal of honor, Salon of 1877; became an officer of the Legion of Honor, 1878; member of the Institute, 1891. "Excommunication of Robert the Pious" and "Release of the Prisoners Walled up at Carcassonne" are in the Luxembourg Gallery, Paris; "Honourous" is in the collection of D. O. Mills, New York. One of his finest works, "Death of General Marceau," is in the Museum at Ghent.

Laurens (lâ-rânss), John, 1753-82; American military officer; "the Bayard of the American Revolution"; b. Charleston, S. C.; son of Henry Laurens, statesman; in 1777 joined the army and was placed on the staff of Washington. From Monmouth to Yorktown he was in all of Washington's battles, and displayed the utmost valor; was badly wounded at Germantown and Coosahatchie; 1781, went as a special minister to France, and successfully negotiated a loan; returning, served with great activity under Greene, and was killed in the contest on the Combahee.

Laurentian Hills, sometimes called THE LAURENTIDES; an upland belt of E. and central British America. From E. Labrador it runs to the SW., and then curves to the W. and NW., approaching the Arctic Ocean E. of the Coppermine River. It separates Hudson Bay from a line of depressions holding the Gulf of St. Lawrence, the Laurentian Lakes, the Lake of the Woods, and Winnipeg, Nelson, Reindeer, Athabasca, Great Slave, and Great Bear lakes, and holds the main water parting except at two points where it is traversed from W. to E. by the Nelson and Churchill rivers. In general it is a plateau from 1,000 to 3,000 ft. in altitude, with an uneven surface, abounding in rocky hills and in lakes. Climate and soil conspire to render it unfertile, and it is almost uninhabited.

Laurentian System, in geology, the lowest and oldest division of rocks. The name was first applied by William Logan, 1854, to rocks in the Laurentian Hills of Canada, which had previously been called metamorphic, and which are separated by a great unconformity from the overlying Potsdam sandstone. Subsequently the name Huronian was applied to portions of the pre-Potsdam rocks, and Laurentian was restricted to portions believed to be older.

Lauren'tius, Saint, d. 258; according to tradition, a Spaniard by birth and a pupil of Sixtus II, who made him deacon, and afterwards archdeacon and treasurer at Rome, 257 A.D. In 258 A.D. the magistrate, during the Valerian persecution, commanded Laurentius to reveal the treasures of the Church; accordingly, the saint collected a company of poor, sick, lame, and blind persons and presented them as the required treasures, for which act he was condemned to be roasted alive on a gridiron over a slow fire. He underwent martyrdom with great courage and resignation. In his honor Philip II of Spain erected the Escorial, because it was on his day, August 10,

1557, that he won at St. Quentin his great victory over the French, and built it in the form of a gridiron.

Lauren'tum, ancient city of Latium, on the coast, between Ostia and Lavinium; 15 m. SSW. of Rome. It is said to have been the capital of Latium when Æneas and the Trojans arrived in Italy. Under the Roman Empire it was incorporated with Lavinium.

Laurier (lô'rî-â), Sir Wilfrid, 1841-1919; Canadian statesman; b. St. Lin, Quebec; was admitted to the bar, 1865; for a short time edited *Le Défricheur*; was a member of the Quebec Assembly, 1871-74. In 1874 he became a member of the Dominion Parliament, attained high rank in the Liberal Party, and by his oratorical powers gained the title "Silver-tongued Laurier." He was Minister of Inland Revenue, 1877-78; leader of the Liberal party since 1887; Premier, 1896-1911; defeated on the issue of reciprocity with U. S., 1911. His tariff legislation, 1897, gave Great Britain the benefit of preferential trade with Canada. Although a Roman Catholic, he made a spirited resistance to the attempted dictation of the Roman Catholic hierarchy in regard to the school question in Manitoba, but he secured the right of separate schools to the Roman Catholics of the provinces of Alberta and Saskatchewan, 1905. In 1900 he promptly dispatched Canadian troops to aid the mother country in S. Africa. He was knighted, 1897.

Lauriston (lô-rês-tôn'), Jacques Alexandre Bernard Law (Marquis de), 1768-1828; French soldier; b. Pondichéry, French India; was Bonaparte's comrade at the Military School of Paris; distinguished himself at the siege of Valenciennes; became under the consulate Bonaparte's aid-de-camp in Italy; served in the fleet of Admiral Villeneuve at Martinique and Trafalgar; 1807, seized on the republic of Ragusa as a reprisal for the Russians having occupied the harbor of Cattaro; 1809, won new laurels at the battle of Raab; and the victory of Wagram was chiefly due to his bringing up 100 cannon in the face of a terrible fire. He negotiated the marriage of Bonaparte with Maria Louisa, for which he was made count and ambassador to Russia. In 1812 he joined the Russian campaign; occupied Leipzig during the battle of Lützen; turned the right wing of the enemy at Bautzen; took Breslau, June 1, 1813; and was captured at Leipzig, and not released till after the peace of Paris. He refrained from rejoining Bonaparte during the Hundred Days, and successively became peer and marquis, and, 1821, marshal.

Laurium (lâ'rî-ûm), promontory of Greece, in Attica. Its famous silver, lead, zinc, and antimony deposits were supposed to be exhausted about the commencement of our era. A foreign company, having bought the land and obtained a concession from the government, 1863, reopened the mines so successfully as to awaken the jealousy of the Greeks, leading to diplomatic interference from France and Italy, and the sale of the mines, 1873, to a Greek company. A village (Ergastiria) of more than 5,000 inhabitants has sprung up

around the furnaces at the old harbor, and is connected with the mines and with Athens by railways.

Lausanne (lō-zānn'), capital of the canton of Vaud, Switzerland; on the N. shore of the Lake of Geneva; built on two hills, connected by a splendid bridge of granite. It has a beautiful Gothic cathedral, a library of 125,000 volumes, many good educational institutions, and several manufactories of tobacco, leather, and gold and silver ware. On account of its beautiful situation on the S. slope of the Jura Mountains, and near the Lake of Geneva, it attracts yearly a great number of tourists. An ecclesiastical council was held here, 1449; a conference between Calvin, Farel, and Viret, 1536, leading to the adoption of the creed of the Reformed faith; and in modern times it has been the scene of a noted peace congress, 1871, and a masonic universal convention, 1875. Pop. (1908) 55,741.

Lausun (lō-zūn'), **Armand Louis de Gontaut** (Duc de), 1753-94; French military officer; b. Paris; commanded a naval expedition which captured Senegal and Gambia from the English, 1779; fought on the side of the N. American colonies against Great Britain; afterwards succeeded to the title of Duc de Biron; was a deputy to the States-General; a confidant and secret agent of the Duke of Orleans; appointed general in chief of the Army of the Rhine, July 9, 1792, of the Army of the Coasts of La Rochelle, May 15, 1793; took Saumur, and defeated the Vendéans at Parthenay. He then tendered his resignation, but being accused of too great lenity to the Vendéans, he was deposed, condemned for conspiracy by the revolutionary tribunal, and executed.

La'va, material, fused or solidified after fusion, which has escaped from a volcanic crater. The term is, however, applied generally to those volcanic rocks which are filled with ragged cellules. If extremely light and loose, it is called scoria or slag. There are several varieties of lava. Molten lava flows like molten glass or iron, a portion being usually unfused and held in suspension in the fused portion, which is, indeed, a native glass. The boiling motion sometimes observed in hot lava is due to the escape of steam, sulphur vapor, carbonic acid, air, etc. Lava beds, after cooling, sometimes exhibit great caverns, which are ascribed to the flowing off of the lower strata of the lava after the cooling of the surface.

Lavagna (lā-vān'yā), town of Italy, province of Genoa, famous for its excellent quarries of slate (Chiappami). This slate is extensively used for roofs, pavements, and other domestic purposes, and is largely exported. The public buildings of the town are imposing, especially the churches, though also the palaces of the Rivarola, the Pallavicini, and the Fransoni families. In the tenth century, Lavagna was the seat of the independent counts Fieschi, who after a long and bitter struggle (1166-98) were compelled to recognize the supremacy of Genoa. Pop. abt. 4,000.

Laval (lā-vāl'), town of France; capital of the department of Mayenne; on the Mayenne

River; 45 m. ESE. of Rennes. It is one of the loveliest towns in France. It consists of two parts of very different appearance. On the right bank of the river—which is here spanned by three bridges—stands the old town with its somber antique castle, now used as a prison; its gayer new castle, now used as courthouse; its cathedral, partly from the twelfth and partly from the sixteenth century. On the left bank, which is lower and almost level, stands the new town, with its broad avenues and its modern structures. The place is noted for its linen manufactures, which were introduced from Flanders in the fourteenth century; other manufactures are paper and earthenware. The royalist insurrection, called the Chouannerie, originated, 1791, near Laval, which was taken by the Vendean army; and a brilliant victory was gained near it over the republicans in October, 1793. Pop. (1901) 25,326.

Laval-Montmorency (-mōn-mō-rān-sē'), **François Xavier de**, 1622-1708; Canadian prelate; b. of an ancient and noble family, at Laval, France; became a priest in Paris, 1645; Archdeacon of Evreux, 1653; Bishop of Petrea in *partibus* and vicar apostolic of New France, 1658. In 1663 he founded the seminary of Quebec; 1674, became bishop of the new See of Quebec, from which he retired, 1688, to his seminary, to which he gave his worldly possessions; was *de facto* ruler of Canada, in civil as well as ecclesiastical affairs. Laval Univ. at Quebec and Montreal commemorates his name.

Lavalle (lā-vāl'yā), **Juan**, 1797-1841; Argentinean military officer; b. Buenos Aires; joined the patriot army, 1813; fought in Uruguay, Chile, Peru, and Ecuador; took part in the campaigns against the Brazilians, 1825-28, distinguishing himself at the battle of Ituzaingó; and was made Governor of Buenos Aires, 1828, but a congress of the provinces declared his government illegal, and a civil war ensued. Lavalle ultimately resigned and retired to Brazil, but later, sometimes with the Brazilians and sometimes in command of provincial forces, he made determined efforts to overturn Rosas, his successor. In 1838 he marched on Buenos Aires, but was compelled to retreat; and after repeated defeats fled to Jujuy, where he was assassinated.

Lavalley (lā-vāl-lā'), **Alexander**, 1821-92; French civil engineer; b. Prognay, Aisne; received most of his practical education in England; 1846, became engineer and manager of the works of Ernest Gouin and Company, constructors of locomotives, etc., and, 1852, built the first wrought-iron railway bridge in France. Associated with Paul Borel, he completed the Suez Canal, and, 1869-75, was its chief engineer. In 1878-86 he was engaged in constructing a harbor and railway on Île de la Réunion.

La Vallière (lā-vā-lē-ār'), **Louise de**, 1644-1710; b. in the province of Touraine, France; was one of the *filles d'honneur* of the Duchess of Orléans, when she became in 1661 the mistress of Louis XIV. She entered a convent as soon as the passion of Louis XIV for others allowed her to bury herself in a religious life. In 1675 she took her religious vows under the

name of Sœur Louisa de la Miséricorde. She left "Letters" and "Reflections on the Mercy of God."

Lavater (lä-fä'tér), Johann Caspar, 1741-1801; Swiss physiognomist and poet; b. Zurich; in 1764 was appointed preacher, first of the orphan house, then of St. Petri Church in his native town, and held this position till his death, which was caused by a wound received at the time Zurich was captured by Masséna. In theology and philosophy he was a mystic. His "Physiognomical Fragments for the Promotion of a Knowledge of Man and of Love of Man," 1775-78, produced a profound sensation. In it he asserted that the soul, the character, the history of an individual was painted on his face; that a human face might be read like a printed leaf. He was also the author of "Looks into Eternity," "Swiss Songs," "The Messiah," and "The Human Heart," poems.

Laveleye (läv-lä'), Émile Louis Victor de, 1822-92; Belgian political economist; b. Bruges. From 1848 he was occupied with economical studies which gave him a great reputation. At first he wrote in the Belgian periodicals, defending liberal principles against the Ultramontanes; became from 1858 a constant contributor to the *Revue des Deux Mondes*; was, 1864, appointed Prof. of Political Economy at the Univ. of Liège; and, 1867, represented Belgium as member and secretary of the international jury on paintings at the Paris Universal Exposition. Among his numerous works that on "Property and Its Primitive Forms" has become a classic.

Lavender, popular name of a labiate shrub (*Lavandula vera*), a native of the S. of Europe, very extensively cultivated for its fra-



COMMON LAVENDER.

grant flowers, which yield a volatile oil much used in perfumery. Lavender water, spirit of lavender, etc., are of considerable service in pharmacy and medicine.

Laveran (lä-vé-rän'), Alphonse, 1842- ; French physician; b. Metz; son of Louis Lave-

ran, an eminent epidemiologist; entered the medical corps of the French army; during a tour of duty in Algeria he discovered in the blood of persons suffering with malarial or paludal fevers a microorganism, the *Hamatozoön malaricæ*, and, 1881, announced his discovery. He was appointed professor at the school of Val de Grâce, and was author of a number of important communications to scientific societies.

Lavigerie (lä-vêzh-rê'), Charles Martial Allemand, 1825-92; French prelate; b. Bayonne; was ordained priest, 1849; Prof. of Ecclesiastical History in the Sorbonne, 1854-61; appointed Bishop of Nancy, 1863; but, 1867, was transferred to the See of Algiers, which was afterwards made into an archbishopric; elevated to the cardinalate, 1882. In Algiers he sought to combine the propagation of Christianity among the colonists with works of active benevolence toward the Arabs. He secured from the British and German governments a promise rigidly to enforce the anti-slavery clause of the Kongo Conference.

Lavoisier (lä-vwä-zê-ä'), Antoine Laurent, 1743-94; French savant; b. Paris; became an associate of the Academy, 1768; obtained a farmer generalship, 1769, in order to increase his income, his expenditures in chemical research requiring a large outlay of money; discovered the composition of water, 1783, and made many important researches in physics. In chemistry he made not only important discoveries and great inventions in apparatus and in methods of work, but he was the destroyer of the false theories of Stahl and Priestley, and was the principal inventor of the system of chemical nomenclature which prevailed exclusively for more than fifty years after his death. Lavoisier was guillotined by the Jacobins on account of his former connection with the farming of the taxes.

Law, Andrew, abt. 1748-1821; American psalmist; b. Cheshire, Conn.; became a clergyman, and was for forty years a teacher of music; published a "Collection of Hymn-Tunes," 1782; "The Rudiments of Music," 1783; "The Musical Magazine," 1792, and "The Art of Singing" (three parts), 1803; was author of the well-known tune "Archdale"; invented four characters to express the four syllables of music; and was one of the earliest American musical composers.

Law, Edmund, 1703-87; English prelate and metaphysician; b. near Cartmel, Lancashire; became Archdeacon of Carlisle, 1743; master of Peterhouse College, Cambridge, 1754; librarian of the university, Prof. of Casuistry, and Archdeacon of Lincoln soon afterwards; Prebendary of Durham, 1767, and Bishop of Carlisle, 1768. Bishop Law was one of the most learned and liberal prelates and acute metaphysicians of his age.

Law, John, 1671-1729; Scottish speculator; b. Edinburgh. Having killed an antagonist in a duel, 1693, he fled to France. Thence he went to Holland, where he made a special study of banking in the great Bank of Amsterdam. In 1700 he returned to Scotland, and

published a work advocating the establishment of a bank which should hold all the sources of revenue of the state in its own hands, and, treating them as capital, issue notes, and at the same time make a profit by discounting.

On the accession of the Duke of Orleans to the regency, Law reëntered Paris with a fortune of more than \$500,000, made by gambling. The financial affairs of the French Kingdom being at this time in the utmost embarrassment, he soon gained a hearing, and, having secured the patronage of the regent, in 1716 established a bank under royal authority. Its stock was soon taken, and a very lucrative business established.

He afterwards organized the Mississippi or West India Company, based on the scheme of colonizing and drawing profit from the French possessions in N. America. It extended its capital to 824,000 shares of 550 livres each, and engaged itself to lend the king 1,600,000,000 livres at 3 per cent. In the fever of stock gambling which followed the shares of the company rose to thirty-five or forty times their original value. Great extravagance resulted. Law was made comptroller general of the finances; but the constant decrease of specie in France and the constant issue of government notes soon undermined the company, and Law became a fugitive. He laid by no money, and it is believed that he acted honestly and with a desire to promote the public welfare. He received from France a pension of 20,000 livres until the death of the regent, and afterwards sank into obscurity, and died in poverty in Venice.

Law, William, 1686-1761; English controversialist; b. King's Cliffe, Northamptonshire; forfeited his fellowship at Cambridge, 1716, by refusing, as a Jacobite, to take the oath of allegiance to George I. and never again officiated in public, though offered tempting livings. He engaged in the famous Baugarian controversy; was the tutor of John and Charles Wesley and the father of the historian Gibbon; was sought as spiritual adviser by many persons; and had great personal influence; most memorable works, a treatise on "Christian Perfection" and "Serious Call to a Devout and Holy Life."

Law, in the physical sciences, a term used to designate "the abstract idea of the observed relations of phenomena, be those relations instances of causation or of mere succession and coexistence." Thus we speak of the "laws" of astronomy, of chemistry, etc. In the social sciences the term is used to express "the abstract idea of the rules which regulate human action." In the social sciences also we associate with the term ideas of cause and effect. This is clearly the case when we speak of "economic laws," but it is also the case when we speak of laws, in the most usual and proper sense, as rules of social conduct declared and enforced by political authority. Such rules are commonly defined by English jurists as commands; but many of the most important rules of law, particularly in the field of private relations (property, family, etc.), simply state that certain facts shall be attended with certain legal results. Thus a

deed drawn in a certain way, and registered in a certain public office, will convey all the rights of the grantor to a piece of land. A deed improperly drawn or not registered will be ineffective. Such rules as these are commands only in a very remote and indirect sense. The customary German definition of laws as declarations of public will is more accurate than the English definitions.

The word law has a double meaning. It sometimes indicates a particular rule—i.e., a particular sequence of fact and result—and it sometimes indicates the totality or sum or "abstract idea" of a body of connected or associated rules. In the latter sense the word carries with it ideas of harmony, order, etc.; and in the field of human law, further ideas of an ethical nature—ideas of right and justice. Hence the system of social order which we call law is called by the Germans, French, Italians, Spanish, etc., "right" (*Recht, droit, diritto, derecho*, etc.). Words analogous to our "law" in derivation or in etymological significance (*Gesetz, loi, legge, ley*, etc.) are used by them, as the Romans used *lex*, to describe single rules of law, particularly those of a statutory character. English-speaking peoples always employ the word in this sense when speaking of a law, and usually when speaking of laws; and always use it in the more general sense when they speak of the law.

The customary classifications of law are really based on the nature of the relations with which each branch of the law deals. Relations between independent states are ordered by *international law*; relations between the state or government and the citizens by *constitutional and administrative law*; the former dealing rather with the organization of the state and the government, the latter with the relations which arise between the government and the citizens in the exercise of governmental powers. All these branches of the law we term *public*. *Private law* deals with relations between individuals. This is again divided (and again, according to the nature of the relations with which it deals) into *property law*—i.e., law of real property, law of personal property, law of obligations—and *family law*—i.e., relations of husband and wife, parent and child, guardian and ward. Property law is again divisible into the law of ordinary property relations (*inter vivos*) and that which deals with relations resulting from death (*relations mortis causa*)—the law of inheritance or succession. Commercial law, or the *law merchant*, and *maritime law*, if treated as special branches of property law, are so treated again, not because any new types of right or duty appear in those parts of the law, but because they deal with relations peculiar to commerce.

From this point of view the law of crimes and of torts and that of criminal and civil procedure are not divisions of substantive law, but fall under the head of remedial law. These parts of the law do not deal with normal relations, but with the results attached to the disturbance of normal relations. We have here, in other words, the *sanctions* of the law. Where the disturbance of the legal order is of a willful and flagrant

character the law makes it a crime or a misdemeanor (*delictum publicum*), and decrees punishment. The prosecution of the offender may be left to the person primarily wronged, but is usually undertaken by an agent of the government, and the action is brought in the name of the state (crown or people). Criminal law attaches its sanctions to every domain of substantive law, public and private. In the field of private law, however, the redress of wrongs and the enforcement of rights are usually left to the initiative of the wronged party (civil action). To the domain of remedial law belong, finally, *international criminal law* and *international private law*, which some French writers group under the common title *droit international particulier*. The purpose of those branches of the law is to minimize, in administering justice, the evils necessarily connected with the existence of independent jurisdictions and with the resulting "conflicts of law."

The law, as a system of social order, is composed of rules partly customary and partly statutory; to the latter we commonly restrict the term "laws." We draw nearly the same distinction, in other words, when we divide all law into *written law* and *unwritten law*. All written or statutory law proceeds from the political sovereign or some authorized organ of the sovereign. (1) The organic or *constitutional law* theoretically proceeds directly from the sovereign; but in the U. S., where the sovereignty is in the people, constitutional amendments are drafted and proposed by a representative body (Congress, or a national convention) and accepted by representative bodies (state legislatures or conventions). (2) Ordinary legislation, in modern states, usually proceeds from a representative body; but in Switzerland laws passed by the legislature may require popular approval, and provision is also made for legislation on popular initiative (the so-called *referendum*). (3) A supplementary power of making rules may be vested in the executive or judicial branches of government, or in special organs of local government, like a city council. We habitually distinguish "the constitution and the laws," on the one hand, and "laws and ordinances," on the other, thus confining the term laws to acts passed by the ordinary legislatures. Some writers insist upon a further limitation, asserting that the so-called *special* or *private acts* passed by a legislature—acts, that is, whose operation is confined to a single person or a narrow group of persons or to a single locality—are not properly laws.

Laws are *abrogated* or put out of force (1) by constitutional amendment; (2) by the exercise of a superior legislative authority; (3) by repeal—i.e., by a contrary statute enacted by the same legislative authority. Repeal need not be expressly declared: a new law whose provisions are incompatible with those of an older law effects *pro tanto* the repeal of the older law. In early times and in semicivilized communities the domain of law is regularly determined by race or by religion; so that the law of a certain tribe or that of a certain confession or sect follows the members of the tribe or sect everywhere, and governs them

only. The modern principle is that all laws are *territorial* in their operation; that they govern all persons within the territory, except foreign sovereigns and the diplomatic representatives of foreign countries; and that they do not operate outside of the territory. As the domain of law is locally restricted, so again it is temporarily restricted. A law begins to be applied only when it comes into existence, and ceases to be applied when it is abrogated. It is recognized as a principle of justice that laws shall not operate retrospectively; that the legal character which has been impressed upon the acts of men or upon other facts by the law existing at the time shall not be changed by subsequent legislation. This principle of the nonretroactivity of laws is affirmed in the U. S. by constitutional provisions, such as those which prohibit *ex post facto* laws and those which restrain the states from impairing the obligation of contract. In countries where no such constitutional restrictions exist, the legislature is competent to pass retroactive laws; but it is a general principle of construction not to assume that the legislature has had such an intention unless it is indicated expressly or by necessary implication. In the field of private law, however, this whole doctrine of the nonretroactivity of laws is limited to cases where definite rights have been vested under an older law.

Lawes, Henry, 1600–62; English composer; b. Salisbury; son of Thomas Lawes, vicar choral in the cathedral; abt. 1625 became one of the gentlemen of the chapel of Charles I; acquired wide reputation as a composer of music for masks and songs; composed the music to Milton's "Cosmos" and the anthem for the coronation of Charles II.

Lawes, Sir John Bennett, 1814–92; English chemist; b. Rothamsted, Hertfordshire; on coming into possession of his estate, 1834, began making experiments in agricultural chemistry for practical farming; and after 1843 was associated with Dr. J. H. Gilbert, whom he engaged as director of the Rothamsted farm, in a systematic series of investigations in the field, the feeding shed, and the laboratory, which made his name famous, and led to the manufacture of artificial fertilizers; created a baronet, 1882.

Lawn, from the Old English *lawnd*, an open clear place, meant formerly an open space between woods, but is now mostly restricted to a space of ground covered with grass for ornamental purposes. In order to produce a thick-turfed, dark-green, velvety lawn, the soil, especially if light, should be well provided with manure, and worked so deeply as to allow the plant to extend its roots below the stratum generally reached by a surface drought. The most popular seed in the U. S. is bluegrass or June grass, to which white clover seed is frequently added in the proportion of three parts of the former to one of the latter; but it is not recommended to mix the grass seed with that of some grain, which is often done. The idea is to produce shade for the young grass plant, but the effect really is that it is starved. A third and indispensable condition is frequent

mowing—once a week, at least once every two weeks, and each spring a little top dressing, especially on any poor spot.

Lawn Tennis, game of ball played by either two or four persons, in a space called a court. It is a modification of the old game of tennis, designed to allow a game resembling tennis to be played on any level piece of ground without any expensive arrangements. The court is marked out by lines on any level, hard surface, grass being the most common, but gravel, asphalt, cement, wood, etc., are also used. The court is 78 ft. long by 27 ft. wide, for two players. For four the court is of the same length, but is 36 ft. wide. It is divided by a net stretched across the middle (A B in the diagram), 3 ft. 6 in. high at the posts and 3 ft. in the middle. The posts stand 3 ft. outside the side lines. The balls are of hollow rubber, covered with smooth, white cloth, cemented to the ball and then sewed. Each weighs 2 oz., and is about $2\frac{1}{2}$ in. in diameter. The ball is struck with a racket made of ash, and strung with catgut.

The game is begun by the players tossing for choice of sides and "service," i.e., the right to make the first stroke of the game. The winner may take either the side or the service, but if he chooses the side, his opponent has the right to serve or not as he may prefer. The player who is to serve throws the ball up into the air with one hand and strikes it with his racket, trying to make it fall in the front part of the court diagonally opposite to him. Should he fail to do so, a fault is called, and the player must try again. Should he fail a second time, two faults are called, and one point is scored for the striker out. Should the server, however, succeed in hitting the ball into the proper

a strike if the ball touches him or anything that he wears or carries except his racket, or if the ball touches his racket more than once. When the first stroke is won the score is called "fifteen." If the second stroke is won by the same player, the score is "thirty"; if the third, "forty," and if the last, "game." In other words, the game is made up of four strokes, each called fifteen, except that for convenience forty is called instead of forty-five. Four strokes won by the same player make game, as stated, but there is one exception.



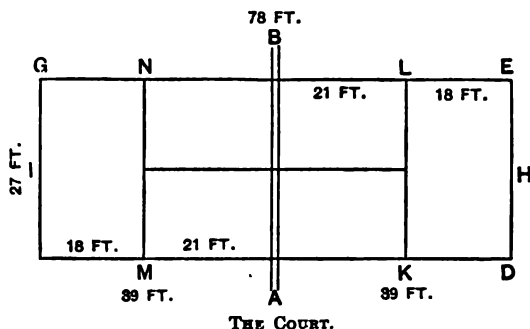
THE RACKET.

Should each player have scored three strokes the score is called "deuce," and an additional stroke "vantage" is introduced. Thus to make game a player must make two consecutive strokes after the call of deuce. Should he make one stroke "vantage," and lose the next, the score returns to deuce. In like manner a "set" is the best of eleven games, i.e., the player who first wins six games wins the set; but should the score be five games all, a player must win two consecutive games to win the set, or the score returns to "games all."

The modern game of lawn tennis was originated by Maj. Wingfield at a country house in Wales, 1874, and was introduced into the U. S. the same year. In 1875 the Marylebone Cricket Club, the ruling body on cricket in England, appointed a committee to frame laws for the game. A year later the All-England Croquet Club, in combination with the M. C. C., revised the laws and held the championship meeting for singles on its grounds at Wimbledon. The All-England Lawn-tennis Club continued to rule the game until the formation of the Lawn-tennis Association, 1887, which is now the governing body in Great Britain.

Lawrence, Abbott, 1792-1855; American philanthropist; b. Groton, Mass.; was an early advocate of the protective tariff, and one of the foremost men in building up American manufactures. He engaged largely in manufacturing, and was one of the principal founders of the city of Lawrence, Mass.; was a member of Congress, 1835-37 and 1839-41; a commissioner to settle the Aroostook boundary question, 1842; U. S. minister to Great Britain, 1849-52; founded the Lawrence Scientific School of Harvard, to which he gave \$100,000; established scholarships and prizes in public schools, and was a liberal benefactor of the Groton Academy, now known by his name.

Lawrence, Sir Henry Montgomery, 1806-57; British statesman and soldier; b. Matura, Ceylon; went to India, 1821, as a cadet in the Bengal Artillery; took part in the Burmese War of 1828, in the first Afghan War of 1838, and in the Sikh wars of 1845 and 1848; was resident at Lahore, 1846-49; then chief of the



THE COURT.

court, his opponent must return it after the first bound. He can play the ball into any part of the server's court, and the server in his turn must return the ball, but he is no longer compelled to place it in any particular part of the court.

To serve, the player must stand directly behind the base line, first on the right of the control line, and for the next stroke on the left, and so on alternately. The server wins a stroke whenever the striker out fails to return the ball into the server's court. The striker out wins a stroke when the server serves two consecutive faults, or fails to return the ball into the striker out's court. Either player loses

board of administration in the Punjab, agent of the governor general in Rajputana (1852), and, 1857, commissioner in Oudh. He conducted the memorable defense of the British residency at Lucknow against the mutineers until, on July 2d, he was mortally wounded. He founded the Lawrence military asylums at Sanawan on the road to Simla, at Murree in the Punjab, at Mt. Abu in the Rajputana, and on the Madras Nilgiri hills, and to these institutions devoted a considerable portion of his large income.

Lawrence, James, 1781-1813; American naval officer; b. Burlington, N. J.; entered the navy, 1798; became lieutenant, 1802; took part in the war with Tripoli, 1804-05; was appointed, 1810, to the command of the *Hornet*, with the rank of master commandant; cruised in Bainbridge's squadron on the S. American coast at the close of 1812, and on February 24, 1813, captured, near the mouth of the Demerara River, the British sloop of war *Peacock*, after an engagement of fifteen minutes. Returning to New York with his prisoners, Lawrence received from Congress a gold medal, was promoted to captain, and commander of the frigate *Chesapeake*. On June 1st, while he was lying in Boston harbor, the British frigate *Shannon*, Capt. P. V. Broke, came in sight with the express design of fighting the *Chesapeake*. Lawrence accepted the challenge, but both he and his principal officers were soon mortally wounded, and the *Chesapeake*, being much disabled, was taken by assault, and carried into Halifax, where he died. His exclamation on being carried below, "Don't give up the ship!" became a household phrase.

Lawrence, John, 1750-1810; American statesman; b. England; became a lawyer in New York; served in the army throughout the Revolutionary War, and, as judge-advocate general, conducted the proceedings of the court of inquiry in the case of Maj. André. In 1785-87 he was a member of the Continental Congress; 1789, was elected the first representative from New York City in the first U. S. Congress, where he sustained Washington and Hamilton; was reelected; appointed U. S. district judge, 1794, and, 1796, was elected to the U. S. Senate, of which he was for a time president.

Lawrence, John Laird Mair (Lord), 1811-79; British statesman; b. Richmond, Yorkshire; brother of Sir Henry M. Lawrence; went to India, 1829, as a cadet in the Bengal Civil Service, and was magistrate successively at Delhi, Paniput, and Gurgaon. In 1846 he became chief commissioner of the newly annexed provinces beyond the Sutlej, and, 1852, of the Punjab. It was owing to his measures that the mutiny of 1857 did not extend into the Punjab. He was Viceroy of India, 1863-68; created baron, 1869, and became chairman of the London School Board, 1870.

Lawrence, Saint. See LAURENTIUS, SAINT.

Lawrence, Sir Thomas, 1769-1830; English painter; b. Bristol; while a child drew likenesses with the pen and pencil; at ten years of age began to paint, and, 1782, was placed,

with the crayon artist, Hoare, at Bath. In 1787 he removed with his father to London, and almost immediately became the fashionable portrait painter of the day, a preëminence which he maintained for more than forty years. In 1792 he was appointed by George III to succeed Sir Joshua Reynolds as his principal painter in ordinary. He was particularly celebrated for his portraits of beautiful women and children. In 1820 he was elected president of the Royal Academy.

Lawrence, capital of Douglas Co., Kan.; on both sides of the Kansas River; 33 m. W. of Kansas City; is the seat of the State Univ. and of Haskell Institute, an industrial training school for Indians; derives excellent water power from the river by means of a dam, and has manufactures of barbed wire, flour, paper, canned goods, straw, lumber, shirts, machinery, and foundry products. The city was founded during the Free-soil and pro-slavery struggle for the admission of Kansas into the Union; was the headquarters of John Brown and other noted Free-soil leaders; was burned by Quantrell and his guerrillas on August 21, 1863, and has made rapid progress since its rebuilding. Pop. (1910) 12,374.

Lawrence, one of the capitals of Essex Co., Mass.; on both sides of the Merrimac River; 26 m. NW. of Boston. The city has unrivaled water power for manufacturing, obtained from the river, which here has a descent of 26 ft. in about half a mile. A granite dam, 900 ft. long and 30 ft. high (begun 1845), was constructed across the rapids at a cost of \$250,000, and a distributing canal, 1 m. long, 16 ft. deep, 100 ft. wide at the head, and 60 ft. wide at the mouth, costing, with locks, \$200,000, was completed in time for the inauguration of the manufacturing industries of the town by water power, February 24, 1848. Subsequently a second canal was built on the opposite side of the river. The city has become widely known for its manufacture of cotton and woolen goods. According to the U. S. census of 1909 the city had 162 factory-system manufacturing plants, compared with 187 in the 1904 census, employing 30,542 wage earners, and having an annual output valued at \$79,993,000. Notable institutions include the Essex County Truant School, City Hospital, Roman Catholic Hospital, high school, public library, courthouse, several denominational homes and asylums, Masonic Temple, and Odd-fellows' Hall; and there is a noteworthy system of public parks. The city was named in honor of the Lawrence family, its principal founders; was incorporated as a town, 1847, and as a city, 1853. Pop. (1910) 85,892.

Law Reports', published statements of opinions given by courts in deciding cases, including the reasons which influenced the court in making the decision, together with a brief account of the pleadings and facts. The report is distinct from the *record*, which is the collection of all papers necessary to the cause. The earliest English reports are the year books, from the reign of Edward II to the end of the reign of Henry VIII, with a few earlier cases. These were compiled by the chief scribes of

the court, and published annually at the expense of the Crown. Since 1865 English law reporting has been well systematized by the action of the bar. In the U. S. every state has its series of reports, and a recent general digest estimates that 500,000 decisions are embodied in American case law. Law reports are especially necessary in Great Britain and the U. S., as it is a well-settled rule in both countries that if a case has been adjudicated by a court of high authority, the principle determined is binding as a precedent upon inferior courts when another case arises involving the same facts; and it will in general be followed in the court itself which rendered the decision unless strong reasons can be given to the contrary. The law in this way consists in the main of a collection of principles evolved from the decisions of actual controversies disposed of by the courts, rather than theoretical propositions laid down by jurists and philosophers.

In all courts respect is paid to the decisions of particular judges of superior capacity. It is proper to urge in argument that a commercial question was decided by Mansfield, or a point in the law of evidence by Ellenborough, or a constitutional question in the U. S. by Marshall, or a rule-of-equity law was established by Hardwicke or Eldon in England, or by Kent or Story in the U. S. (2) The reporter prefixes to the opinions of the judges a statement of the facts in the case, as well as a "head note" containing an abstract of the points decided. Points actually decided as material to the issues of the case are indicated by the word "*Held*," those discussed and not so decided by "*It seems*," or "*Semble*."

Lawton, Henry Ware, 1843-99; American military officer; b. Manhattan, Ohio; attained the rank of brevet colonel of volunteers in the Civil War; entered the regular army as second lieutenant, 1866; became lieutenant colonel and inspector general, 1889, after having taken part in several Indian campaigns and the pursuit and capture of the fugitive chief, Geronimo; commissioned major general of volunteers for the war with Spain, 1898; was the "hero of El Caney," Cuba; transferred to the Philippines after the war; made commandant of Manila, and was killed on the firing line by Filipino sharpshooters at San Mateo.

Lay, John Louis, 1832-99; American inventor; b. Buffalo, N. Y.; was appointed second assistant engineer in the U. S. navy, 1862; distinguished himself by accompanying Lieut. William B. Cushing on the expedition against the Confederate ram *Albatross*, and by designing the torpedo with which that vessel was destroyed. After the fall of Richmond, 1865, he was sent up the James River in advance of Admiral Porter's fleet to remove obstructions. Soon after the war he resigned and entered the Peruvian service. In 1867 he invented the submarine torpedo which bears his name and sold it to the Government.

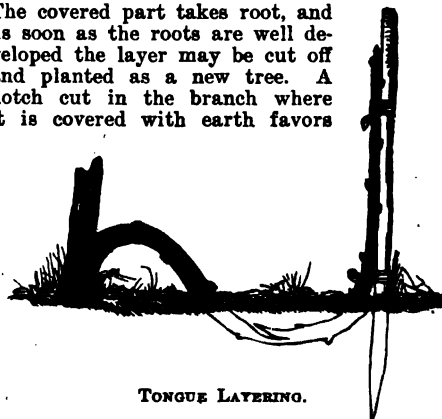
Layard, Sir Austen Henry, 1817-94; English archaeologist; b. Paris, France, of English parents; after extended travels in the East, where he learned the Arabic, began, 1845, under the auspices of Sir Stratford Canning, Brit-

ish ambassador in Constantinople, his explorations of the Assyrian ruins around Mosul. He was engaged for nearly eighteen months in excavating the great mound of Nimrud, and brought to light sculptures, bas-reliefs, hieroglyphics, specimens of glass and pottery, and other monuments of Assyrian civilization. In 1847 he sent to England several cases of antiquities, including the colossal human-headed lions and bulls and the Nimrud obelisk, which were deposited in the Assyrian transept of the British Museum. He returned to England the same year, and prepared his "Nineveh and its Remains," followed by two folio volumes of illustrations and a volume of cuneiform inscriptions. In 1849-50 he resumed the excavations at Nimrud, discovering tablets with Ninevitic records of great value, after which he transferred the scene of his labors to Babylon, with no important result. On his return he published "Discoveries among the ruins of Nineveh and Babylon, with Travels in Armenia, Kurdistan, and the Desert." He was elected to Parliament, 1852 and 1860, and was Under Secretary of State for Foreign Affairs, 1852 and 1861-66; appointed Chief Commissioner of Works, 1868, minister at Madrid, 1869, and at Constantinople, 1877; elected foreign member of the Institute of France, 1890.

Laybach (L'bakh). See LAIBACH.

Laycock, Thomas, 1812-76; English physiologist; b. Wetherby, Yorkshire; was the first to formulate, 1844, the theory of the reflex action of the brain; became Prof. of the Practice of Physic and of Clinical Medicine at Edinburgh, 1855; physician to the queen in Scotland, 1869; wrote much on sanitary science, physiology, mesmerism, insanity, etc.; author of "Mind and Brain, or the Correlations of Consciousness and Organization," "Methods of Medical Observation," etc.

Laying, or Layering, propagation of plants by bending down branches and covering the portion to be rooted with earth. The covered part takes root, and as soon as the roots are well developed the layer may be cut off and planted as a new tree. A notch cut in the branch where it is covered with earth favors



TONGUE LAYERING.

the early development of the new roots. Layering may be done either in fall or spring in outdoor plants.

Lazarists, body of Roman Catholic missionary priests, founded by St. Vincent de Paul,

1624. The name is derived from the College of St. Lazare at Paris, their original house given them, 1632, but their proper title is Priests of the Mission. They are engaged in foreign, and especially in domestic missions, and in the teaching of theology. They are found in most civilized and in several barbarous countries, and have fourteen establishments in the U. S., including three colleges.

Lazulite, or **Asurite**, mineral composed of phosphate of alumina, magnesia, and iron, and bearing some resemblance in color to lapis lazuli.

Lazzari (lăt-ză'rě), name frequently given to DONATO BRAMANTE, 1444-1514; Italian architect; b. Monte Asdrualdo; was at first a painter, but preferred architecture; settled in Rome, 1499, where he built the beautiful palace of the Cancellaria and the Tempietto on the hill, near St. Pietro in Montorio. Then employed by Pope Alexander VI, he worked on the new buildings of the Vatican Palace, such as the Belvedere Court, and then undertook the great task of St. Peter's Church, already begun by Alberti and Rossellino, but now undertaken on a larger and more perfect plan. He was in charge of this work from 1506 until his death.

Lazzaroni (lăt-ză-rō'ni), formerly the popular name for the lower classes of Naples; so called from the Hospital of St. Lazarus, their customary place of refuge. The lazzaroni of Naples numbered at the close of the eighteenth century nearly 40,000 persons, who had no fixed employment or home, but were by turns porters, boatmen, or peddlers, besides their constant recourse to begging. From the Middle Ages they derived the obligation to wear a peculiar dress of the simplest description, were treated by the government as a separate class, electing annually a chief called *capo lazzaro*, and often took part in political revolutions. They have lost their former character as a distinct class, and the term as now used applies to the proletarian element in the population, including many law-abiding and industrious citizens.

Lea (lē), Henry Charles, 1825-1909; American historical writer; b. Philadelphia, Pa.; son of Isaac Lea, naturalist; entered the publishing house founded by his grandfather, Matthew Carey, which still exists as Lea Brothers, and retired from business, 1880. He wrote, 1840-60, many papers on chemistry and conchology. His most important works are "Superstition and Force," "Sacerdotal Celibacy," "Studies in Church History," "History of the Inquisition of the Middle Ages," "Chapters from the Religious History of Spain," "Formula of the Papal Penitentiary in the Thirteenth Century," "History of Sacramental Confession and Indulgences in the Latin Church," "The Moriscoes of Spain: Their Conversion and Expulsion," "History of the Inquisition of Spain."

Lea, Isaac, 1792-1886; American naturalist; b. Wilmington, Del.; was engaged in business in his early youth, and in 1821-51 was a part-

ner with his father, Matthew Carey, in the publishing business in Philadelphia. In 1815 he was elected a member of the Philadelphia Academy of Natural Sciences, and began to contribute papers to its *Journal*. In 1827 he began a series of memoirs on fresh-water and land mollusks, which were continued for nearly fifty years, and form the materials for a great work on American Unionida. His memoirs include "Synopsis of the Family of Naiads" and "Observations on the Genus Unio." He was chosen president of the Philadelphia Academy, 1858.

Lead, after iron, the most abundant and widely distributed of the metals. It is bluish gray in color, soft and ductile, but without elasticity. Its specific gravity is 11.35. It fuses at 612° F., and when raised to a white heat in the open air it volatilizes, burning with a blue flame and leaving an oxide known as litharge. Its uses in the arts are varied, such as for roofing, for lining sinks, cisterns, etc., for shot and balls for firearms, and for making pipe. This latter is formed by mechanical pressure, the softness of the lead permitting of its being forced out in tubes of indefinite length without welding. From the facility with which lead pipes are made and afterwards bent, cut, and united, they are almost universally employed as conduits for the distribution of water through buildings in cities; and this employment of lead pipes has created the plumber's trade, which takes its name from *plumbum*, lead. Type metal is formed of an alloy of lead and antimony, and the alloys which go by the name of pewter or solder are composed of lead and tin.

The most important of the compounds of lead are *white lead*, a basic carbonate of lead of varying composition, according to the method of preparation; *litharge*, the oxide, used in the manufacture of flint glass, as a glaze for earthenware, for the preparation of lead acetate, lead nitrate, lead plaster, and for drying oils; *red lead*, or *minium*, an oxide, used as a pigment in the manufacture of flint glass, as a cement in making steam joints, and in the manufacture of secondary batteries; *nitrate of lead*, used as a material for the preparation of the carbonate and chromates; *acetate of lead*, or *sugar of lead*, familiar article with many uses in medicine, is made by dissolving litharge in wood vinegar or other cheap form of acetic acid; and *chromates of lead*, comprising *chrome yellow* and *chrome red*, two brilliant and valuable pigments. The usual alloys of lead are arsenic, antimony, silver, gold, and platinum.

According to the returns of the smelters and refiners the imports of lead into the U. S., 1905, consisted of 55,444 short tons of base bullion and 25,340 tons of lead in foreign ores, equivalent to about 79,500 tons of lead. Deducting this from the total production of pig lead of 399,302 short tons, there remains an estimate of about 320,000 short tons as the make of lead in that year from ores mined in the U. S. Of the total production of pig lead, 296,186 short tons was desilverized lead, and 103,116 short tons soft lead. The sources of production were Idaho, Colorado, Utah, Montana,

Nevada, New Mexico, Arizona, California, Washington, the group comprising Alaska, Oregon, S. Dakota, and Texas, and the group comprising Missouri, Kansas, Wisconsin, Illinois, Iowa, Virginia, and Kentucky. The estimated available supply, 1905, was 415,479 short tons; estimated consumption 347,015 short tons. The total production of lead amounted, 1910, to 372,227 short tons, valued at \$32,755,976.

Lead Poisoning, diseased condition resulting from the presence of much lead in the system. This condition is induced in various ways: (1) By the use of lead pipe for the conduction of drinking water. Happily, a large proportion of the waters used for drinking and cooking cause an insoluble deposit on the lead pipes, and hence have not the power to take up lead in this manner; but a great number of cases of lead poisoning are induced in this way. (2) By the use of lead pipes in racking off wines, cider, and beer; by the use of lead-lined chambers in soda-water apparatus and the like. (3) By the use of lead paints; hence the name painter's colic applied to one symptom of lead poisoning. (4) Various unusual ways of introduction are recorded. Thus cosmetics, hair dyes, and similar materials have sometimes caused lead poisoning. Opium is the chief remedy in ordinary lead poisoning. Cathartics are very useful, except when there is much tenderness of the bowels. Then their use should be deferred for a time. Iodide of potassium is prescribed in chronic cases, and is believed to assist in the elimination of the metal. Sulphuric acid and the sulphates are given with a view to precipitating lead in the intestines and rendering it insoluble.

Leadville, capital of Lake Co., Col.; 114 m. SW. of Denver; is on the N. side of California Gulch, which was one of the first containing free gold discovered in the state, and on the Mosquito range of the Elk Mountains, 10,200 ft. above sea level. From \$12,000,000 to \$15,000,000 in placer gold was taken from California Gulch in 1860-64, when the claims became unprofitable to work, and the site was almost deserted till 1877, when the presence of carbonate silver ore was accidentally discovered on Iron Hill. In 1905 the Leadville camp produced more than half of the state's output of lead. The city has large smelting and refining works, courthouse, hospital, jail, almshouse, and good public schools. Pop. (census of 1910) 7,508.

Leaf, one of the parts of the plant body, especially in the higher plants. The leaf always stands in a definite relation to the stem, the former being supported by the latter. The stem and its leaves constitute the shoot, which is equivalent to the thallus (thallus) of lower plants. The leaf is essentially an expansion of chlorophyll-bearing tissue, its framework, epidermis, etc., being accessory structures. In the simpler cases there is but one layer of cells, as in some seaweeds and many mosses; but in most cases there are at least several layers, the outermost being especially modified, as an epidermis. With the increase in size of the leaf (in aerial plants) there is an increased development of support-

ing tissues, forming more or less branched systems of ribs and veins. These grow with the leaf, consequently the pattern which they present is dependent upon the mode of growth of the leaf. Where the leaf growth is lengthwise only, as in many grasses and sedges, the veins run parallel from base to apex, but where the growth is in all directions, as in the cabbage, grape, etc., the veins are crooked and irregular. The leaf outline also is dependent upon its mode of growth; where the growth is uniform the margin is entire, but where some sections grow more than others, the outline presents certain irregularities (serrations, dentations, lobing, etc.), all of which have been very accurately defined by descriptive botanists.

Phyllotaxy, or the particular arrangement of the leaves upon the stem, has received much attention, even to the working out of mathematical formulas, but here again we find

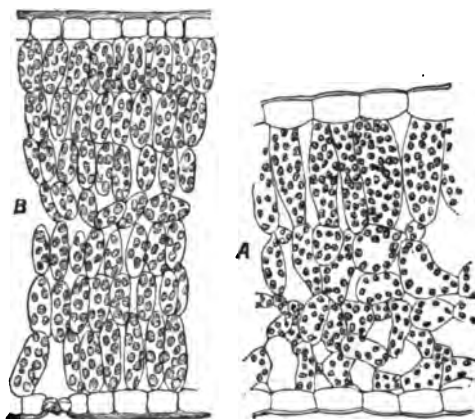


FIG. 1.—A, Section of Wild-cucumber Leaf; B, Compass Plant Leaf.

that the law is a very simple one: that in the bud "new lateral members have their origin above the center of the widest gaps between the insertions of the nearest older members of the same kind at the circumference of the growing point." The chlorophyll-bearing cells of the leaf are commonly arranged so that in one or more layers (palisade layers) they stand with their longer axes perpendicular to and touching the upper epidermis (Fig. 1, A). The remaining cells are loosely and irregularly arranged, with many large intercellular spaces. In leaves whose two surfaces are equally exposed to the sunlight there are palisade cells on both sides, as in the compass plant (*Silphium laciniatum*) of the prairies of the U. S. (Fig. 1, B), the cottonwood, etc.

The epidermis of one or both surfaces contains many breathing pores (stomates), which are formed by the division and splitting of an original epidermis cell (Fig. 2). Each pore thus lies between two cells, the guard cells, which retain their activity, and by contracting and expanding increase and decrease the size of the opening. Leaves with a marked difference between their palisade and loose parenchyma have few if any pores in the upper

epidermis; but when this difference is less internally, the pores are more nearly equal in number; thus in the compass plant there are in the upper surface 82 per sq. mm. (52,700 per sq. inch), and in the lower 87 per sq. mm. (57,300 per sq. inch), while in the apple there are none above, and 246 per sq. mm. (158,670 per sq. inch) below. The function of the stomates is the ingress and egress of gases, and

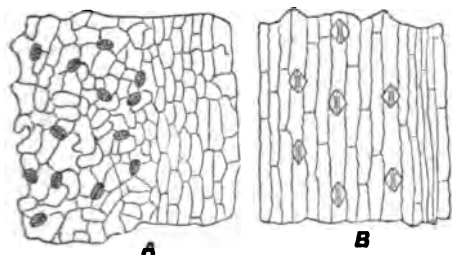


FIG. 2.—A, Epidermis and stomates of Beets; B, of Oats.

more particularly the ingress of carbon dioxide and oxygen. The whole leaf structure is designed to secure as much aëration as possible with the least loss of moisture; but in spite of epidermis, and the opening and closing stomates, some moisture escapes.

League of Nations, an international organization formulated by the Peace Conference in Paris, in April, 1919, the purposes of which are succinctly set forth in what has been variously called the "constitution" and the "covenant" of the League. The preamble of the document recites: "In order to promote international co-operation and to achieve international peace and security, by the acceptance of obligations not to resort to war, by the prescription of open, just and honorable relations between nations, by the firm establishment of the understandings of international law as to actual rule of conduct among governments, and by the maintenance of justice and a scrupulous respect for all treaty obligations in the dealings of organized peoples with one another, the high contracting parties agree to this covenant of the League of Nations." The city of Geneva, Switzerland, was selected as the capital of the League, and Sir James Eric Drummond as its secretary-general.

Lean'ing Tow'ers, towers which overhang their base on one side, the deviation from the vertical having been caused by settlement of the foundation, explosion, or the like, as there is no evidence of any such effect being produced deliberately. There are two surprising towers at Bologna, leaning toward one another across a very narrow space, so that they seem almost to touch—the Torre Asinelli, about 300 ft. high, and overhanging 4 ft., and the Torre Garisenda, not more than 160 ft. high, but 10 ft. out of plumb. In Venice the slender tower of the Church of San Giorgio dei Greci slopes visibly outward over its narrow canal. The bell tower of San Benedetto, at Ferrara, and the clock tower of the ancient palace of the Venetian Governor at Padua, slope, and a tower at Neviansk, in Siberia, is mentioned as having a decided inclination; but the most fa-

mous and most noteworthy of all is the bell tower of the Cathedral of Pisa. The height is about 175 ft., and it overhangs its base 13 ft.

Leap Year, a year which contains 366 days, being every fourth year, which leaps over a day more than a common year. Thus in common years, if the first day of March is on Monday the present year, it will next year fall on Tuesday, but in leap year it will leap to Wednesday, for leap year contains a day more than a common year, a day being added to the month of February. Every year is a leap year which is divisible by 4 without remainder, except the concluding years of centuries, every fourth only of which is a leap year; thus the years 1800 and 1900 are not leap years, but 2000 and 2400 are. See BISSEXTILE.

Leath'er, insoluble compound of the gelatin and fibrin of hides and skins with tannic acid, though under the general name of leather are included many kinds in which the hide or skin is preserved and made suitable for various uses without such chemical union of the gelatin and tannin, and also where other materials than tannic acid are used in combination with the gelatin and fibrin of the skin. Leather has been made from the most remote periods. The Hebrews ornamented it with bright colors, and they employed it, after the manner of the Egyptians, for vessels to contain water, and for a multitude of other uses. The paintings and sculptures of Thebes represent many of the methods of working leather practiced by this people as very similar to those of the present time. For tanning they used the pods of the *sont* or *acacia*, the *acanthus* of Strabo and other writers, and probably also the bark and wood of the *rhus oxyacanthoides*, and the bark of the *acacia* *seal*, both natives of the desert. Of the methods of preparing the leather used by the Romans no accounts are preserved; and the processes of the Middle Ages also are lost. In the Pacific countries of N. America leather is skillfully tanned by the natives, who employ some of the vegetable productions of the country for the purpose. Sir Edwin Arnold, when in India, discovered a pair of slippers in a sarcophagus containing nothing else but a small heap of dust. In the British Museum there are among the Egyptian relics tanned crocodile backs which were used as armor. In the U. S. the oldest leather of which there is any record is that which has been found in the huts of the rock dwellers of Arizona, in the shape of sandal thongs.

The heaviest ox and cow hides form the principal material from which sole leather is made; those from cattle not fully grown, and also from the smaller cattle of India and Africa, are generally made into what are called upper leathers, in contradistinction from calf-skins; upper leather, as known to the trade, including kip, wax kip, grain, buff, and split leather. Horse hides are used to only a limited extent in the U. S., but are largely manufactured in Europe. The American bison and the Calcutta buffalo also furnish material for sole leather. Hog skins make the best saddle seating, but more imitation hog skin is sold for this purpose than genuine. Sheepskins, of

which the supply is large, furnish probably more kinds of leather than are derived from any other source. The leather has but little strength and no solidity, but it is quickly tanned, generally with alum or sumach, and worked up whole or split, and serves for the cheaper kinds of pocketbooks, bookbinders' leather, shoe linings, hat linings, etc. Deer-skins are largely used to make what are known as buckskin gloves and mittens, and this leather is often sold for chamois or white leather. Most of the hides for tanning are obtained from the prairies of the West and Southwest, principally Texas, New Mexico, and Kansas; Mexico, Central America, the pampas of the country tributary to the Plata River in S. America, and various portions of India and Africa.

Enameled or Patent Japanned Leather.—Almost all kinds of hides or skins are or have been japanned. The general consumption, however, is confined to cowhide, horsehide, and calf. The usual procedure is to fill the surface, either flesh or grain side of the leather, with a daub called sweetmeats, consisting mainly of boiled linseed oil and a filling substance, and then, after a smooth surface has been obtained, to give the hides or skins a covering of varnish or japan, and then bake until the varnish is hardened. Fancy colors are also made.

Russia leather is an article that formerly was in use for the choicest kinds of leather fabrics, pocketbooks, satchels, and the like. Bookbinders preferred it for the binding of their most costly volumes. The leather had a peculiar odor. Small quantities of it were imported into the U. S., and more could have been sold if it had been imported. In 1873 the U. S. Minister to Russia, Marshall Jewell, himself a tanner, discovered the process by which it was made, and the result was that "Russia" leather became a commodity of extensive manufacture and sale in the U. S., and it is of quite as good quality as the imported. The process of manufacture is to steep the leather which is to be Russianized in a solution of 50 lb. each of oak and hemlock bark and sumac, 1 lb. of willow bark, and 900 gallons of water; heat by steam and immerse the sides till struck through, and while the material is still damp to smear on the outer side a solution of oil of birch bark dissolved in a little alcohol and ether. This imparts the odor and the pliability.

The statistics of the manufacture of leather, tanned, curried, and finished, as reported by the U. S. census, 1909, showed 919 plants, operated on a capital of \$332,727,000, employing 62,202 wage earners, paying \$32,103,000 for wages and \$248,279,000 for materials used in manufacture, and having a combined output valued at \$327,874,000. During the fifty-five years ended 1905 the capital in this industry increased nearly tenfold, the number of wage earners more than doubled, and the total wages increased more than threefold. Pennsylvania ranked first, 1905, in the production of oak and rough leathers; Massachusetts in calf, kid, and sheep leathers; and Wisconsin in harness leather. In the fiscal year 1910-1 the imports of leather amounted in value to

\$5,376,175 and manufactures of leather to \$9,260,545, and the exports of leather to \$37,199,666 and manufactures of leather to \$16,473,390.

Leather Board, article much used in the manufacture of boots and shoes. It is made of old Manila rope, hemp rope, jute, or linen canvas and leather scraps, to which are added certain chemicals and a cement which makes it more impervious to water than leather. The rope or canvas and leather scraps are first ground to a pulp. The pulp is then run off by a wet-cylinder machine and cut into sheets; these sheets are then dried and are run through calendering machines to smooth them, and are afterwards pressed by still heavier machines to give an even surface and still greater solidity. It is also pressed into different forms convenient for use, among which are counters or stiffenings for boots and shoes, which by a patent process are made perfectly waterproof.

Leavenworth, Henry, 1783-1834; American military officer; b. New Haven, Conn.; became a lawyer; entered the volunteer army for the war with England, 1812; afterwards became a brigadier general in the regular army; was in the battles of Chippewa and Niagara Falls and the expedition against the Arickaree Indians; founded several military posts on the W. frontier, including Fort Leavenworth, site of the present city of Leavenworth, Kan.

Leavenworth, capital of Leavenworth Co., Kan.; on the Missouri River, 312 m. NW. of St. Louis. Excepting its water front, the city is surrounded by bluffs 300 ft. high. The river is here spanned by an iron railway bridge that cost \$1,000,000 and a steel one that cost \$670,000. Manufacturing is promoted by several coal mines in the city and vicinity. Here are the Pro-cathedral of the Immaculate Conception, State Orphan Asylum, Mt. St. Mary's Academy, St. John's, Cushing, Leavenworth, and Mitchel hospitals (each with a training school for nurses), Whittier Library, and many private benevolent institutions. Fort Leavenworth, a U. S. military reservation, on which is a regular military post, a military prison, and a widely known military school, is 2 m. N. of the city. The manufactures include carpets, furniture, carriages and wagons, boots and shoes, boilers, engines, mining machinery, iron bridges, cigars, and jewelry. Pop. (1910) 19,363.

Lebanon, celebrated range of mountains in Syria, extending about 110 m. along the sea-coast from the Nahr-el-Kibir (Eleutherus) River on the N. to the Nahr-el-Litany (Leontes) on the S.—i.e., from the great pass opening into the valley of Hamah (Hamath) to the vicinity of Tyre, and separated by the elevated valley of El-Bukaa (Cœle-Syria), 10 to 20 m. wide, from the parallel range of Anti-Libanus, similarly extending from near Homs (Emesa) on the N. to the peak of Jebel-eash-Sheikh (Hermon), a few miles S. of Damascus. Between the mountains and the sea the plain of Phenicia is of varying breadth, but never more than 10 or 15 m., while spurs

are several times thrown off which jut precipitously into the sea. The base of the range has an average breadth of twenty miles; the peak of Jebel Timarun attains a height of 10,533 ft. The elevation decreases toward the S., and falls rapidly from the twin peaks of Tomat-Niha (6,500 ft.) to the wild, abrupt ravine of the Litany, whose banks sometimes rise perpendicularly 1,000 ft. The inhabitants are chiefly Maronites, a Christian sect, in the N., and Druses, professing a corrupted Mohammedanism, in the S. These races are rivals, and have for centuries been at feud. The district is subject to a Maronite governor, depending on the pashalic of Damascus. Capital, Nahr-ed-Dammur, formerly called Deir-el-Kamr. Pop. of province, abt. 250,000.

Lebanon, capital of Lebanon Co., Pa.; on Swatara Creek and Union Canal; 25 m. E. of Harrisburg; is in an agricultural, limestone, brownstone, anthracite coal, and brick-clay region, 5 m. N. of the great Cornwall iron hills; is principally engaged in iron manufacturing, and has a gravity system of water works, Good Samaritan Hospital, and Washington and Soldiers' parks. Moravian and Mennonite churches were created here, 1740; the town was laid out 1750, and incorporated 1821. Pop. (1910) 19,240.

Lebeau (lè-bô'), Jean Louis Joseph, 1794-1865; Belgian statesman; b. Huy, province of Liège; practiced as an advocate with great success; and founded in 1824 the *Journal Politique de Liège*, which contributed to that alliance between the Clerical and Liberal parties which made it possible for the Belgian provinces to dissolve the union with the Netherlands. As member of the Congress of 1830, and Minister of Foreign Affairs, 1831, he opposed the annexation to France and the election of the Duke of Nemours as king. He advocated the election of Leopold, and served under him as Minister of Justice to 1834; was called once more, 1840, to the Ministry of Foreign Affairs, but retired before the violent opposition of the Clerical Party.

Le Bœuf (lè bœf'), Edmond, 1809-88; French military officer; b. Paris; entered the artillery, 1822; served in Algeria, 1837-40; went to Crimea, 1854, as colonel and chief of the staff of the artillery, and distinguished himself in the battle of Alma and at the artillery attack on Sebastopol; was made a brigadier general, 1854; became a general of division, 1857, and took an important part in the Italian War of 1859. He was Minister of War, 1869-70. In March, 1870, he was created a marshal, and when the war with Germany began, became the actual commander of the army, but was compelled to resign, his inefficiency and the utter lack of preparation of the troops having been proved. As commander of the Third Corps, he took part in the battles of Vionville, Gravelotte, and Noisseville. At the surrender of Metz he became a prisoner of war.

Lebrun (lè-brûn'), Charles, 1619-90; French painter; b. Paris. He displayed early so decided a talent for art that the Chancellor Seguier sent him to Rome, where he remained

six years. In 1648 he was recalled to France, where his work was much appreciated. His "Martyrdom of St. Andrew" and that of "St. Stephen" in Notre Dame led to his being admitted to the Academy that year. Lebrun painted the battles of Alexander in a series which included the "Family of Darius," considered his masterpiece. He decorated the palace of Fontainebleau, the great gallery of Versailles, the chapel and pavilion of Aurora in Colbert's Palace of Sceaux. He was chancellor and director of the Royal Academy of Painting and Sculpture in Paris, and president of the Academy of St. Luke in Rome. Through his influence the French Academy was established in Rome, 1666.

Lebrun, Charles François (Duke of Piacenza), 1739-1824; French statesman; b. St. Sauveur-Lendelin, Normandy; was Maupeou's most influential adviser during his chancellorship; as a member of the Constituent Assembly had great influence. He was chosen president of the Council of Five Hundred, 1796; was made third consul by Bonaparte, 1799, with the supreme direction of the finances and of the internal administration. Under the empire he was archtreasurer, was made Duke of Piacenza, and also Governor of Liguria. In 1810-14 he was Governor of Holland. On the advent of the Bourbons he was excluded from the Chamber of Peers, but in 1819 he was allowed to take his seat.

Lebrun, Marie Anne Elisabeth Vigée, called MADAME VIGÉE-LEBRUN, 1755-1842; French painter; b. Paris; was the daughter of Louis Vigée, a painter of some ability, and was married young to J. B. P. Lebrun, a dealer in works of art and a writer. She painted many portraits of Queen Marie Antoinette, and was popular with the court nobles; was made a member of the Academy, 1783; 1783, she left France and resided at Rome, Naples, Vienna, and other cities. Portraits of Lady Hamilton, Lord Byron, and the Prince of Wales, afterwards George IV, date from this time. In Paris, under Bonaparte's influence, she painted his sister, Caroline Murat, and other persons of the imperial court. Undoubtedly she is the most famous artist among women. The best opportunity to study her work is in the Louvre, where are seven or eight important pictures.

Le Cap'. See CAPE HATTIEN.

Lecce (lèt'châ), ancient *Lycia* or *Lupia*, one of the most beautiful towns in S. Italy; in the province of Lecce; on a plain between the Adriatic on the N., the Gulf of Taranto on the W., and the Ionian Sea on the S. The town is regularly built of a remarkably fine white stone, and has many interesting edifices, especially churches and convents. There is a public library, and there are well-established day and evening schools and numerous charitable institutions. Lecce (probably of Cretan origin) was very flourishing during the Roman period, escaped the barbarians, and, 1000 A.D., was governed by its own counts, among whom were Tancred and Bohemond. Pop. (1901) 32,687.

Lech'ford, Thomas, lawyer from London who settled in Boston, Mass., 1638, the first of his

profession to practice in New England. He returned to England, 1641, much dissatisfied with his experience; published, 1642, "Plaine Dealing, or Newes from New England's Present Government," etc., and, 1644, "New England's Advice to Old England." He is said to have died soon after. Though hostile to New England, Lechford's work contains valuable information.

Lecky, William Edward Hartpole, 1838-1903; British historian; b. near Dublin, Ireland; published anonymously, 1861, "The Leaders of Public Opinion in Ireland"; settled in London, and surprised the learned world, 1865, by the "History of the Rise and Influence of the Spirit of Rationalism in Europe," a work which united to an elegant style a judicial impartiality and a more than German erudition. It was speedily republished in the U. S., as were also his next works, "A History of European Morals from Augustus to Charlemagne," and "A History of England in the Eighteenth Century."

Leclerc (lè-klär'), Victor Emmanuel, 1772-1802; French general; b. Pontoise, near Paris; after acquiring military fame, aided in the establishment of the consulate, and became general of division. In 1801 Napoleon appointed him captain general of Santo Domingo, to enforce the restoration of slavery, and he reached Samana early 1802, with a large fleet and a force exceeding 30,000 men. On May 1st a truce was concluded, during which Toussaint l'Ouverture was sent as prisoner to France. The infuriated blacks renewed hostilities under Dessalines, while the French were decimated by yellow fever, to which Leclerc succumbed. His wife Pauline, Napoleon's sister, escorted his remains to France.

Lecocq (lè-kök'), Alexandre Charles, 1832-1911; French composer; b. Paris; educated in the Conservatory there. He is best known as the composer of numerous *opéras bouffes*, of which "Les Cent Vierges," "La Fille de Madame Angot," "Giroflé-Girofla," "La Marjolaine," and "Le Petit Duc" are the best known. His works have had a remarkable popularity.

Le Conte (lè könt'), Joseph, 1823-1901; American geologist; son of Lewis Le Conte; b. Liberty Co., Ga.; settled, 1848, as a physician in Macon, Ga.; became Prof. of Natural History at Franklin College, 1853, and was Prof. of Chemistry and Geology in the Univ. of S. Carolina, 1856-69, accompanying his brother John, 1869, to California, where he took the Chair of Geology in the Univ. of California. He was vice president of the International Congress of Geologists, 1891, and president of the American Association for the Advancement of Science, 1892. He is most widely known through his "Elements of Geology," but wrote also on optics, aeronautics, biology, art, education, philosophy, and the relations of religion and science.

Leconte de Lisle (dè lèl'), Charles Marie, 1818-94; French poet; b. St. Paul, Island of Réunion; settled in Paris, 1847. His first volume was "Poèmes Antiques" (1853). The

volume was accompanied by a preface of importance. It distinctly expressed the ideas of the so-called neopagan movement. It arraigned romanticism and modern art altogether for its abandonment to the personal and emotional element. A group of writers followed his lead, and were called Impassibles. "Poèmes et Poésies" followed, 1855; "Poèmes Barbares," 1862, and "Poèmes Tragiques," 1883. The poems usually take their subjects from the sacred traditions and myths of various peoples.

Lecouvreur (lè-kò-vrèr'), Adrienne, 1692-1730; French actress; b. near Eprenay. In 1702 her parents settled at Paris, and after receiving some instruction from the actor Legrand she went on the stage at Strassburg, 1716. In the following year she made her début at the Théâtre Français in Paris, where she very soon attained the first place both in comedy and tragedy. Maurice of Saxony was her lover, and when he was made Duke of Courland she sold her diamonds and jewels in order to lend him the money necessary to take possession of the country.

Le Creusot (lè krè-zò'). See CREUSOT, LE.

Le'da, in Greek mythology, daughter of Thestios, King of Ætolia, and wife of Tyndareos, King of Sparta, to whom she bore Timandra, Philonoe, and Clytemnestra. Her beauty enthralled Zeus, who assumed the shape of a swan and surprised her in the bath. Though she was already pregnant by her husband with Clytemnestra and Castor, yet by her divine lover she conceived Pollux and Helen, and was delivered of all four at the same time.

Ledochowski (lèd-ò-chòv'skè), Mieczalas Hal-ka (Count de), 1822-1902; Polish prelate; b. Ledochow, Galicia; became domestic prelate and prothonotary apostolic to Pope Pius IX; Archbishop of Thebes in *partibus infidelium*, 1861; was appointed, 1866, Archbishop of Gnesen and Posen, becoming thereby *ex officio* Primate of Poland. On May 26, 1873, he headed the protest against the new Prussian ecclesiastical laws which placed the choice of bishops and priests in the hands of the people of the diocese or parish. Persistently refusing to appear before the courts to justify his action, he was imprisoned at Ostrowa, 1874-76, after which he took up his abode in Rome. He was made a cardinal, 1875, and appointed prefect of the Propaganda, 1892.

Ledru-Rollin (lè-drü-rò-län'), Alexandre Auguste, 1807-74; French revolutionist; b. Paris; began to be known soon after the revolution of July, 1830, as an advocate in important political cases, as an editor of republican newspapers, and as a celebrated lawyer in ordinary lawsuits. In 1841 he was elected member of the Chamber of Deputies, and upheld openly the doctrines of republicanism in the chamber. For a short time he was the most conspicuous figure in the revolution of 1848. He checked the plans of the monarchists and as Minister of the Interior, one of the provisional government of the republic, he put in practice his theory of universal suffrage. He was a candidate for the presidency, but received only a small vote. On June 13, 1849, he headed a

demonstration against the Roman policy of the government, and as the movement was regarded as an actual insurrection, he was forced to flee. He took refuge in England, where he coöperated with Mazzini, Kossuth, and other revolutionary leaders in propagating democratic principles. While there he wrote a work entitled "The Decline of England." Returned to France, 1870; he did not wish to reënter the political arena, but the Republicans elected him deputy, 1873, and he was one of the members of the extreme Left in the Versailles Assembly.

Ledyard (lĕj'ard), John, 1751-89; American traveler; b. Groton, Conn.; joined Capt. Cook's third expedition round the world. After his return he served in the British navy, and, 1782, to avoid fighting against his native country, escaped from a man-of-war lying off Long Island. Having fruitlessly endeavored to fit out an expedition to the NW. coast, he embarked for Europe with the design of making a journey through N. Europe and Asia, and across Bering Strait to the W. hemisphere. Arriving at Stockholm, he attempted to cross the Gulf of Bothnia on the ice to Finland, but found open water. He changed his course, and in the dead of winter walked in seven weeks 1,400 m. around the whole coast of the gulf to St. Petersburg. He proceeded to Irkutsk, whence he sailed in a small boat 1,400 m. down the river Lena to Yakutsk. Returning to Irkutsk, he was arrested, and conducted to the frontiers of Poland. He found his way back to London, and, 1788, started to cross the African continent in a westerly direction from Sennaar, but died at Cairo. Many extracts from his journals and his private correspondence with Jefferson and others are given in his "Life" by Jared Sparks.

Ledyard, William, abt. 1750-81; American revolutionary soldier, uncle of the preceding; b. Groton, Conn. On September 7, 1781, commanding 157 militia in Fort Griswold, New London harbor, he resisted for an hour 800 British, who lost two commanding officers and 200 men before effecting an entrance. Maj. Bromfield, a Tory in command, demanded, "Who commands this garrison?" Ledyard replied, "I did, sir, but you do now," handing him his sword, which Bromfield plunged through the body of Ledyard. A massacre of the Americans ensued, and more than 100 of them were killed and wounded.

Lee, Ann, 1736-84; English religious leader; b. Manchester; was married to a man named Stanley, and soon began to take part in the conventicles of James and Jane Wardley, the original "Shaking Quakers," whom she succeeded as the leader of the sect, 1771, soon after which she was for a time confined in a jail, and then in a madhouse. After her release she was acknowledged as a "mother in Christ," and assumed the title of "Ann, the Word." In 1774 she went with a few followers to New York, and, 1776, settled at Watervliet, near Albany. Here she was charged with high treason and witchcraft, and was imprisoned at Albany and Poughkeepsie.

Lee, Arthur, 1740-92; American diplomat; b. Stratford, Va.; son of Thomas Lee, Governor of Virginia; after practicing medicine at Williamsburg, studied law in the Temple, London, and was admitted to the bar, 1770; published letters in defense of the colonies, and a pamphlet entitled "An Appeal to the English Nation." In 1770 he became the agent of the colony of Massachusetts, in association with Franklin, and, 1774, presented the addresses of Congress to the king and people of England. After acting as the London agent of the Committee of Secret Correspondence with the friends of the colonies in Europe, he, 1776, removed to Paris, where, with Franklin and Silas Deane, he secured a treaty of alliance with France. In 1777 he visited Madrid and Berlin as a commissioner from the United States, and 1778-79, was sole commissioner to Spain and acting commissioner to Prussia. His quarrels with his fellow commissioners led Congress to recall him, 1779. He served in the State Assembly of Virginia, 1781-82, in Congress, 1782-85, and on the Board of Treasury of the Confederate States, 1784-89.

Lee, Charles, 1731-82; American military officer; b. Dernhall, Cheshire, England; was the son of a colonel in the British army; served in Braddock's expedition, and was wounded at Ticonderoga, 1758; distinguished himself in Portugal; became later a soldier of fortune; aid-de-camp to the King of Poland and a major general; entered the Russian service against the Turks. In 1773 he purchased an estate in Berkeley Co., Va., and became an ardent Whig. In 1775 he was chosen major general of the Continental army; took part in the defense of Charleston; and, 1776, was taken prisoner at Baskingridge, N. J. It is now considered certain that while in prison Lee made treasonable propositions to the enemy. If 1778 he was exchanged, and at the battle of Monmouth his insubordination nearly lost the day. He was court-martialed, was suspended for one year from command. He retired to Virginia, and a disrespectful letter sent by him to Congress caused his dismissal from the service.

Lee, Francis Lightfoot, 1734-97; American statesman; son of Thomas Ludwell Lee; b. Stratford, Va.; served in the House of Burgesses, 1765-72; delegate in the Continental Congress, 1775-79; signer of the Declaration of Independence; rendered important services in framing the old Articles of Confederation, insisting, as conditions of peace with England, on the right to the navigation of the Mississippi, and to the Newfoundland fisheries.

Lee, Henry, 1756-1818; American military officer; b. Westmoreland Co., Va.; father of Gen. Robert E. Lee; at beginning of Revolutionary War was appointed captain of a company of Virginia cavalry, and served afterwards both in the North and South in command of a partisan corps known as Lee's Legion, while Lee himself was familiarly known as Lighthorse Harry. He was in Congress, 1786; member of the Virginia convention of 1788 that ratified the Federal Constitution; Governor of Virginia, 1792-95; commander in

chief of the expedition against the whisky insurgents, 1794; and again a member of Congress, 1799. In his celebrated eulogy on Washington, prepared by direction of Congress, occur the words, "First in war, first in peace, and first in the hearts of his countrymen." In 1809 he was confined for debt in Spottsylvania Co., Va., and wrote his "Memoirs of the War in the Southern Department."

Lee, Richard Henry, 1732-94; American statesman; b. Stratford, Va.; son of Thomas Lee; was early chosen to the House of Burgesses, where he at once took a commanding position on the side of popular rights, and was in Congress, 1774-79, 1784-85, and 1787. He was the author of the famous motion of June 7, 1776, "That these United Colonies are, and of right ought to be, free and independent States," etc., and advocated the Declaration of Independence in a bold and brilliant speech. During 1780 he was for a portion of the time in the field at the head of the militia of Westmoreland Co. He was U. S. Senator from Virginia, 1789-92, and, though not a Federalist, supported the administration of Washington with zeal.

Lee, Robert Edward, 1807-70; American military officer; b. Stratford, Va.; son of Gen. Henry Lee; was graduated at West Point and assigned to the engineers, 1829; chief engineer on the staff of Gen. Scott in the Mexican War; superintendent of the Military Academy, 1852-55; promoted colonel, 1861; resigned on the secession of Virginia; and was made commander of the Confederate forces in Virginia with the rank of major general. He took no important part in the war for more than a year. On June 3, 1862, he was given command of the Army of N. Virginia, and on the 26th began against the Union army under McClellan the Seven Days' battle, which resulted in its virtual abandonment of the siege of Richmond. After the defeat of Pope at the second battle of Bull Run, August 29th and 30th, Lee entered on the invasion of Maryland, which was baffled by McClellan at Antietam, September 16th and 17th. He then recrossed the Potomac into Virginia, and, having taken possession at Fredericksburg, was attacked on December 13th by Burnside, who was signally defeated. Hooker, Burnside's successor, turned Lee's left flank, and gained his rear. Then ensued the battle of Chancellorsville, May 2-4, 1863, in which Hooker was worsted. Having gathered all the available forces in the Carolinas and Virginia, Lee moved into Pennsylvania, and fought the battle of Gettysburg with the Union army under Meade, July 1st-3d. On the first day, when only parts of each army were present, the Confederates gained decided advantages. Those gained by them on the second were apparent rather than real. On the third day they met with a signal repulse. Lee, closely followed by Meade, retreated into Virginia and took position on the Rapidan, where, having lost about half his army in the campaign, he remained during the following winter. Meade's offensive movement in November was easily checked.

When the spring campaign of 1864 opened,

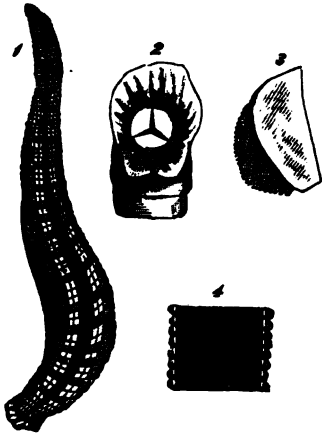
Lee had about 60,000 men strongly intrenched on the S. bank of the Rapidan. To combat these Grant had about 140,000. On May 4th Grant moved to turn the Confederate army by the right. The Rapidan was crossed without opposition, and the army proceeded to the S. The line of march lay through the W. verge of the Wilderness. Lee attacked his opponent while moving through this wooded region, and the bloody but indecisive battle of the Wilderness followed, May 5th and 6th. Grant undertook to outflank Lee by marching on Spottsylvania Courthouse. Lee reached that place first, where his forces intrenched themselves, and severe fighting ensued, which culminated in another indecisive battle on May 12th. On the 18th Grant moved S. from Spottsylvania, and Lee was gradually forced back toward Richmond until the close of May, when the Confederates stood at bay, strongly intrenched, on the Chickahominy. Grant's attack on June 3d at Cold Harbor was signally repulsed. On June 12th Grant marched down the Chickahominy to the James, which he crossed, and took up a position near Petersburg, from which the S. communications of Richmond could be assailed. Lee crossed the Chickahominy and the James, and undertook the defense of the Confederate capital. The subsequent operations in Virginia thereupon resolved themselves mainly into the siege and defense of Petersburg. This lasted until April, 1865, when, Grant having fairly passed around the extreme right of the Confederate defenses, and having broken through the lines, Lee abandoned Petersburg and Richmond, April 2d. The Confederate army retreated and was closely pursued by Grant. On the 9th Lee surrendered at Appomattox Courthouse. The list of paroled prisoners contained 27,805 names, but of these hardly a third had arms. Although Lee had in February been appointed general in chief, with the command of all the forces of the Confederacy, the capitulation only applied to the army in Virginia; but the surrender of this army virtually brought the war to a close. After the war Lee retired into private life. In October, 1865, he became president of Washington College, at Lexington, Va., the name of which was after his death changed to Washington and Lee Univ.

Leech, John, 1817-64; English illustrator and draughtsman; b. London; began his artistic career by making lithographic drawings illustrating "Bell's Life in London," and in 1837 illustrated Theodore Hook's story, "Jack Brag." His etchings for Barham's "Ingoldsby Legends," "Punch's Pocketbook," and Surtee's sporting novels, extended his reputation. He made woodcuts for *Hood's Comic Annual*, Dicken's "Christmas Carol," Gilbert & Becket's "Comic History of England" (in which were also some etchings), the periodical *Once a Week*, etc. He worked for *Punch* for twenty years, his last drawing appearing November 5, 1864.

Leech Lake, body of water in the N. part of Cass Co., Minn.; is about 20 m. long, 16 m. wide, and discharges its waters into the Mississippi by the Leech Lake River.

LEECH

Leech, any one of the members of the order *Hirudinei*. Leeches have an elongate flattened body (nearly cylindrical in a few), terminated at either end by a sucking disk. The mouth is in the center of the anterior sucker, and in the jawed leeches it is surrounded by three radiating jaws, each of which is double, the halves



1. LEECH. 2. ANTERIOR EXTREMITY MAGNIFIED. 3. JAW DETACHED. 4. PART OF BELLY MAGNIFIED.

each resembling a segment of a circular saw. By means of these the leech makes the incisions through the skin which were so familiar in the days when blood letting was regarded as a panacea for every ill. Two kinds of sense organs occur—a varying number of eyes on the front segment and organs possibly of taste or smell on the other segments. The sexes are united in the same individual.

Leeds, town in the West Riding of Yorkshire, England, on the river Aire; 55½ m. W. of Hull. It is a parliamentary and municipal borough, and a county in itself. The public buildings include the Royal Exchange, Corn Exchange, Municipal Art Gallery and Museum, Coliseum, General Infirmary, Yorkshire College, grammar school (founded, 1552), Mechanics Institution, and the parish church, St. Peter's. Leeds is the chief center of the woolen manufacture of the United Kingdom. Owing to iron and coal mines in the vicinity, it manufactures locomotives, engines, mill machinery, steam plows, etc. Brass founding is a considerable industry. Boots and shoes, cigars, chemicals, terra cotta wares, and falence are among other articles produced. Leeds has easy access by water to Liverpool and Hull by the Leeds and Liverpool Canal and the Aire and Calder navigation. Estimated pop. of municipal borough (1911) 445,568.

Leeuwarden (lè-wär-dèn), capital of Friesland, Netherlands; 10 m. from the sea, 70 m. NE. of Amsterdam; is intersected by numerous canals; contains the Stadhuis, royal palace, government house, palace of justice, orphanage, exchange, and many benevolent and educational institutions; has manufactures of linen, paper, musical instruments, and gold and silver

LEFEBVRE-DESNOUETTES

ware, and a considerable trade in cattle, swine, butter, flax, and spirits. Pop. (1907) 35,189.

Leeuwenhoek (lè-wèn-hók), **Antonius van**, 1632-1723; Dutch naturalist; b. Delft; was originally a merchant and afterwards an optical instrument maker; was among the first to employ the microscope in anatomical and physiological investigations, of which he made a great number by means of simple microscopes of his own construction. He was particularly distinguished for his discovery of the red globules of the blood, 1673, of the infusorial animalcules, 1675, and of the spermatozoa, 1677.

Lee'ward Islands, colony of Great Britain; in the W. Indies, N. of the Windward Islands colony. The colony was created, 1871, and embraces the islands of Antigua, St. Kitts, Dominica, Montserrat, and the British portion of the Virgin Islands, with their dependencies (Barbuda, Redonda, Nevis, Anguilla, etc.); area, 701 sq. m.; pop. (1901) 127,536; seat of government, Antigua.

Lefébure-Wély (lè-fä-bür-vä-lè'), **Louis Jacques Alfred**, 1817-70; French organist and composer; b. Paris; was one of the greatest organ players of the French school; compositions include an opera, a cantata, three masses, three symphonies for orchestra, upward of 200 pieces for the pianoforte, and numerous organ pieces in all styles.

Lefebvre (lè-fävr'), **François Joseph** (Duke of Danzig), 1755-1820; marshal; b. Ruffach, Alsace; became general of division, 1794; distinguished himself especially at the battle of Fleurus; on June 4, 1796, he led the van of Kléber's army against the Austrian position at Altenkirchen; on March 25, 1799, at Stockach, successfully resisted for several hours with 8,000 men a force of 36,000 Austrians; aided Bonaparte to overturn the Directory; became a senator, and, 1804, marshal. At Jena he commanded the foot guards. Danzig surrendered to him, May 24, 1807, after a siege of fifty-one days, and he was made duke. He subsequently served in Spain, at Eckmühl and Wagram, and in Russia as commander of the Imperial Brigade. His most brilliant exploit was his campaign in Spain, 1808. He took Bilbao, and defeated the British under Blake on November 7th. In 1814 he commanded the left wing of the army opposing the invasion of the allies, but after the abdication of Napoleon he submitted to the Bourbons, and was made a peer by Louis XVIII.

Lefebvre-Desnouettes (-dä-nò-ët'), **Charles** (Count), 1773-1822; French soldier; b. Paris; distinguished himself at Austerlitz; became general of division, 1808; began the siege of Saragossa, but soon joined the corps of Bessières; and was taken prisoner and sent to England. While on parole he escaped, and, 1809, commanded the chasseurs against Austria; greatly contributed to the victory of Bautzen, May 21, 1813; and finally fought with great intrepidity at Fleurus and Waterloo. Having deserted the Bourbons on Napoleon's return from Elba, he was after the second restoration condemned to death and fled to the

U. S., where he attempted to found a colony of French refugees at the South. He received 150,000 fr. under Napoleon's will, and was shipwrecked off the Irish coast.

Lefuel (lâ-fû-êl'), **Hector Martin**, 1810-80; French architect; b. Versailles; became architect of the palaces of Meudon and Fontainebleau, chief architect of the national palaces, and Prof. in the School of Fine Arts; built the Palace of Fine Arts for the Exposition of 1855, and completed the new Louvre, 1857, after modifying the plans of Visconti.

Leg, any limb of an animal that is used in supporting the body, and in walking and running; in a narrower sense that part of the human limb from the knee to the foot. The human leg has two bones, the inner called the tibia or shin bone, the outer called the fibula or clasp bone. The tibia is much the larger of the two, and above is connected with the thigh bone to form the knee joint, the fibula being attached to the outer side of its head. In front of the knee joint, situated within a tendon, is the knee cap or patella. The lower end of the tibia and of the fibula enter into the ankle joint, the weight being conducted to the foot by the tibia. (See **FOOT**.) In the fore-leg are muscles which extend the foot, and on the back of the leg are two large muscles which form the bulk of the calf of the leg, and which unite in a thick tendon, the tendon Achilles. These muscles are used in walking, jumping, etc.

Legacy, gift of personal property by will. In Rome a legacy was an injunction to an heir to give or pay to a third person a part of the inheritance; in American law, it is a bequest of goods or chattels by testament. Such testamentary disposition must be administered by the executor or other representative of the testator, though the legatee acquires an inchoate right to the legacy under the will itself. Legacies are general, specific, or demonstrative. A legacy is general when it does not bequeath a particular thing or part of the estate by distinguishing it from all others of the same kind, as the gift of a horse without indicating any particular horse. A legacy is specific when it refers by particular description to a certain chattel, showing an intention that the legatee shall have the very thing, and not an equivalent value. Demonstrative legacies are such as are general in their nature, but to be satisfied out of a particular fund. A legacy lapses if the legatee die before the testator, or if after his death, yet before the contingency happened upon which the legacy was to vest. Statutes in many of the states extend the benefit of legacies to the lineal descendants or other heirs of legatees; and the consequences of lapse may always be avoided by special provisions in the will.

Le Gallienne (lâ gâl'yân), **Richard**, 1865-; English author; b. Birkenhead; works include "Volumes in Folio," "George Meredith: Some Characteristics," "The Book Bills of Narcissus," "English Poems," "The Religion of a Literary Man," "Prose Fancies," "Robert Louis Stevenson, and other Poems,"

"Retrospective Reviews," "The Quest of the Golden Girl," "If I Were God." He traveled and lectured in the U. S., 1898.

Leg'ate, in ancient Rome, the title given to an ambassador, or to the lieutenant of the supreme civil and military magistrate; in ecclesiastical history, the title of the representative of the pope in his intercourse with sovereigns or with national churches. At present the resident ambassadors or legates of the Holy See near first-class powers are called nuncios, and those at second-rate courts internuncios.

Legaspe (lâ-gâth'pâ), **Miguel Lopez de**, 1510-72; Spanish commander; b. Zumarraga, Guipúzcoa; went to Mexico, where for several years he was chief secretary of the city government; commanded an expedition fitted out by the viceroy, Velasco, for the conquest of the Philippines, 1564. The first Spanish settlement, called San Miguel, was founded at Zebú, and various expeditions were made to the other islands. The conquest of Luzon was begun 1570, and, 1571, Legaspe founded Manila.

Legendre (lâ-zhândr'), **Adrien Marie**, 1752-1833; French mathematician; b. Paris; became professor in the Military School of Paris, 1774; succeeded D'Alembert in the French Academy, 1783, and, 1787, was appointed, with Cassini and Méchain, to connect the observatories of Greenwich and Paris by a series of triangles. In 1794 he published his chief work, "Éléments de géométrie," which has been translated into all languages.

Legge (lêg), **James**, 1815-97; Scottish sinologist; b. Huntley, Aberdeenshire; went as missionary to the Chinese, 1839; returned to England, 1873, and, 1875, was made Prof. of the Chinese Language and Literature at Oxford; published "The Chinese Classics," "The Life and Character of Confucius," "The Religions of China," and some minor works.

Leg'horn (Italian, Livorno), capital of province of Leghorn, Italy; on a tongue of land between the mouth of the Calambrone on the N. and the lowest spur of the Tuscan Apennines on the S.; 62 m. WSW. of Florence. A navigable canal connects it with the Arno, which enters the sea 7 m. N. of the town, and smaller canals intersect it in various directions. There are two harbors, the old and the new, the latter—S. of the former and overlooked by the large lighthouse—being capable of receiving vessels of heavy tonnage, and even ships of war. The first notices of Leghorn are of the ninth century, and relate to the building of a church there, but it had little importance for a long time. At the close of the fourteenth century it was under the protection of the French king, who, 1407, sold it and its territory to Genoa for 26,000 gold ducats. Genoa ceded it, 1421, to Florence for 100,000 gold florins, and this republic, aware of the value of her new possession, spared no pains to increase its prosperity. Under the Medici the harbor was improved, the fortifications were strengthened, and exceptional privileges and immunities granted to the inhabitants; religious toleration was also established, so that merchants of all nations flocked thither. To-

ward the end of the eighteenth century Leghorn fell into the hands of the French, who impoverished it by forced contributions and forced loans, from which it recovered but slowly. It has a beautiful cathedral and a costly synagogue. The import trade embraces cotton, wool, cutlery, hardware, etc., and colonial products generally. The export trade is in silks, straw hats, borax, coral, and many of its own manufactures, which consist chiefly of oil, soap, tobacco, salt, etc. Pop. (1901) 98,321.

Legion, military organization of the ancient Romans, combining all the constituent elements of an army, and numbering from about 3,000 to about 6,000 men.

Legion of Honor, French order of merit instituted May 19, 1802, by Napoleon Bonaparte; consists of several ranks, viz., grand officers, grand crosses, commanders, and knights. Its distinctions are conferred for civil, but more especially for military achievements. The order possesses considerable wealth, of which the proceeds are paid out in pensions to wounded and disabled members and others.

Legislature, law-making body of a national or state government. In modern constitutional countries there prevails a threefold division of the functions of government: (1) The legislative department, or legislature, which makes the laws and exercises more or less complete control over their administration, especially with regard to public finance; (2) the judiciary department, or the courts, which expound and apply the laws; and (3) the administrative department, or the executive, which enforces them. For the composition of national legislatures, see articles on the countries. See CONGRESS; REPRESENTATION.

Legnano, town in Italy, province of Milan, about 17 m. NW. of the city of Milan; is famous for the victory won by the Lombard League over the Emperor Frederick I, May, 1176. So complete was the success of the league that Frederick concluded the Peace of Venice in the following year, and subsequently the Treaty of Constance (1183), substantially guaranteeing the independence of the cities. Pop. of commune (1901) 16,668.

Legumin (lē-gū'mīn), one of the vegetable proteids, or, as they are sometimes called, albuminoids; is very similar in its chemical properties and composition to animal casein, the substance of cheese—that is, of curd of milk—occurs extensively throughout the vegetable kingdom, but is more especially found in various kinds of seeds and nuts; derives its name from the fact that, with starch, it makes up almost the whole substance of the seeds of leguminous plants, such as peas and beans.

Leguminosae, family of dicotyledonous flowering plants, with alternate, stipulate leaves, separate and mostly irregular petals, a single simple ovary (rarely 2-15 ovaries), in fruit producing a legume (i.e., a beanlike pod). The species (7,000) present numerous exceptions to these characters. Many species are of great economic importance, yielding food for

man (beans, peas, vetches, soy, lupines, peanuts, etc.) or for domestic animals (clover, alfalfa, vetches, sanfoin, etc.), wood for fuel or construction (locust, rosewood, mora, wattles, etc.), dyes (indigo, red sandalwood, camwood, Brazil wood, logwood, etc.), gums (tragacanth, kino, tolu, copal, copaiva, acacia, etc.), medicines (species of *Acacia*, *Cassia*, *Astragalus*, *Tamarindus*, *Glycyrrhiza*, etc.), ornamental plants (species of *Lupinus*, *Lathyrus*, *Wistaria*, *Robinia*, *Phaseolus*, *Acacia*, *Mimosa*, etc.).

Lehigh (lē'hī) Riv'er, stream in Pennsylvania; rises in Pike Co.; traverses a region remarkable for its beauty and famous for its great production of anthracite coal; passes the Blue Ridge at Mauch Chunk, and at Easton unites with the Delaware; is nearly 100 m. long, and for 70 m. has been improved for slack-water navigation.

Lehigh University, institution founded and endowed by Asa Packer, of Mauch Chunk, Pa.; located at S. Bethlehem, in the midst of the great engineering, metallurgical, and mining industries of Pennsylvania. It comprises a school of literature, having three courses of study, the classical, the Latin scientific, and the course in science and letters; and a school of technology, which has six distinct courses, civil engineering, mechanical engineering, mining and metallurgy, electrical engineering, chemistry, and architecture. There are five buildings devoted to the general purposes of instruction, and also a chapel, a library building, an astronomical observatory, and a gymnasium. The university has about 60 professors and instructors, over 700 students in all departments, about 125,000 volumes in its library, scientific apparatus valued at \$387,000, grounds and buildings, \$1,600,000, and productive funds, \$1,216,000.

Leibnitz (līp'nīts), Gottfried Wilhelm, 1646-1716; German philosopher and mathematician; b. Leipzig; son of the actuary of the university; took the doctor's degree in law at Altdorf, 1686, and declined a professorship in the university; removed to Frankfort, 1667, where he published his famous essay, "New Method of Learning and Teaching Jurisprudence"; was appointed by the elector a member of the Court of Appeals, 1670; was especially interested at this time (and subsequently) in effecting a reconciliation between Protestants and Roman Catholics. To the German electors he submitted a memorial, counseling a united Germany as the only means of giving peace to Europe, and in order to divert Louis XIV from making war with Germany submitted in person a memorial, pointing out the conquest of Egypt as the key to India and the humiliation of Holland. Napoleon afterwards carried out the scheme in order to threaten Great Britain's power in the East.

During a residence in Paris he was initiated by Cassini and Huyghens into deep mathematical studies that resulted in the discovery of the differential calculus, 1676. In 1676 Leibnitz took an office at the court of the Duke of Brunswick-Lüneburg, who, 1678, conferred on him the rank of counselor, and later made him

custodian of the Wolfenbüttel Library. In 1698, at the request of his former pupil, the Princess Sophia, he removed to Berlin, and there established the scientific society which grew into the Univ. of Berlin. The great literary work of his life, a history of the House of Brunswick, occupied much of his time after 1687. His other works include "Theory of Concrete Motion," "Theory of Abstract Motion," "Essay of Theodicea on the Goodness of God, the Liberty of Man, and the Origin of Evil," "New Essays on the Human Understanding," "Preestablished Harmony," "Monadology" (1714), in which he developed his metaphysical system, "De Arte Combinatoria." Leibnitz's writings are astonishing for their number and variety. His unpublished manuscripts fill the whole side of one of the rooms of the Hanoverian library, and range over the subjects of law, history, theology, speculative philosophy, mathematics, and all the natural sciences. There is scarcely a branch of human knowledge which his wonderful mind did not explore and enrich.

Leicester (lēs'tér), Robert Dudley (Earl of), 1533-88; British courtier; son of the Duke of Northumberland; became the favorite of Queen Elizabeth, who created him Earl of Leicester, 1564, and, 1566, proposed his marriage with the Queen of Scots, but later his secret marriage with the widow of Essex aroused the anger of the queen. He was sent to the Low Countries as captain general, 1585 and 1587, but displayed no capacity; was, 1588, generalissimo of the troops raised on the threatened invasion of the Spanish Armada.

Leicester, capital of Leicestershire, England; on the Soar River; 97 m. NNW. of London; is a parliamentary and municipal borough and a county in itself; is well built, and has many wide and attractive streets; is the center of a great agricultural and wool-raising district, and is principally engaged in the manufacture of hosiery, boots and shoes, and elastic fabrics. The old townhall is supposed to occupy the site of a hall which belonged to a guild of Corpus Christi, and contains, with some old carvings, stained glass supposed to be of Henry VII's time. The new townhall (1874-75) is an extensive edifice in the Queen Anne style. Among the chief remains of Leicester Castle, which existed before the Conquest, is a portion of the Great Norman Hall in which several parliaments were held in the fifteenth century. On the N. side of the Newark (New Wark), an area added to the castle by Henry, Earl of Lancaster, Leicester, and Derby, father-in-law of John of Gaunt, is Trinity Hospital, founded by him, 1330, for fifty old men and five women as their nurses. Wyggeston's Hospital for twelve men and twelve women and three chaplains was founded, 1513, by William Wyggeston, and rebuilt on a new site. To the N. of the borough and on the bank of the Soar are the remains of Leicester Abbey, founded 1143, where, 1530, Cardinal Wolsey came to ask "a little earth for charity," and, dying, was buried in the precinct. St. Nicholas, the oldest of the churches, dedicated abt. 1224, is an example of very rude early Norman. St.

Margaret's, a beautiful stone edifice erected 1444, is Early English and Perpendicular. Leicester was a Roman station, and many remains of the Roman occupation have been discovered in it. The castle, said to have been founded 914, and to have been rebuilt after the Conquest, had fallen into such dilapidation that when Richard III passed through the town on the eve of the battle of Bosworth, he preferred sleeping at the Blue Boar, a hostelry long since destroyed. In the Civil War Leicester held for the Parliament, was taken by the Royalists, and retaken by Fairfax. Its modern history presents few features of interest. Est. pop. (1911) 227,242.

Leichhardt (lich'härt), Ludwig, 1813-(probably) 1848; German explorer; b. Trebatsch, Prussia; traveled through Italy, France, and England, and went, 1841, to Australia, where he made a great name for himself as an explorer. The results of his first minor travels were published in "Beiträge zur Geologie von Australia." His large tour from Moreton Bay on the E. coast to Port Essington on the N. coast (1844-46), he described in his "Journal of an Overland Expedition in Australia from Moreton Bay to Port Essington." In December, 1847, he started on a still greater expedition across the continent from E. to W., but the last report which came from him was dated Fitzroy Downs, April 8, 1848, and later researches have confirmed that he perished on the trip.

Leiden (lî'dên). See LEYDEN.

Leif Erikson (lêf êr'ík-sûn), or **Ericsson**, abt. 970-1021; Norse navigator, son of Eric the Red. About the end of the tenth century he went from Greenland to Norway, where he was converted to Christianity, which, upon his return, he introduced into Greenland. Abt. 1000 A.D. he sailed W. with an exploring party to seek the land sighted, but not explored, some years before by Bjarne Herjulfson, and discovered the continent of N. America, which he called Markland ("Woodland"), or Vinland ("Wine-land"), on account of the abundance of wild grapes growing there. He is supposed to have landed in Labrador, Newfoundland, or on the New England coast, and he may have established a colony on the latter. His voyages, as narrated in the Icelandic sagas, are confirmed by the historian Adam of Bremen. A monument to "Leif the Discoverer" was erected in Boston, Mass., 1887.

Leighton (lâ'tôn), Frederick (Lord), 1830-96; English historical, genre, and portrait painter; b. Scarborough; studied in Berlin, Florence, Frankfurt, Brussels, and Paris; exhibited "The Procession of Cimabue's Madonna" at the Royal Academy, London, 1855. It was bought by the queen, and after that he studied in Paris four years under Ary Scheffer; became a Royal Academician, 1869; knighted, 1878, when he was elected president; created baronet, 1885; made an officer of the Legion of Honor, 1878; corresponding member of the Institute of France; member of the Academy of St. Luke, Rome, and Academy of Florence; elevated to the peerage, 1896; was a distin-

guished sculptor, and received a medal of honor for his works in that branch of art at the Paris Exposition of 1889. A triptych, "Music," is in the ceiling of the house of Henry G. Marquand, New York, and the "Reconciliation of Montague and Capulet" is owned by Mrs. Joseph Harrison, Philadelphia.

Leinster (lín'stér), province of Ireland, comprising the SE. portion of the island, bordering on the Irish Sea and St. George's Channel; area, 7,626 sq. m.; pop. (1901) 1,152,829. Before the English invasion this province formed two kingdoms, those of Leinster and Meath; now it is divided into twelve counties, namely: Dublin, Meath, Louth, Kildare, Carlow, Kilkenny, King's, Longford, Queen's, Westmeath, Wicklow, and Westford.

Leipoa ocellata (lí-pō'á ō-sél-lá'tā), scientific name of the native pheasant of Australia, a gallinaceous bird of the family *Megapodidae*, somewhat smaller than the turkey. Its flesh is good and its eggs are excellent.

Leipzig (líp'tsikh), city of Saxony, Germany; at the junction of the Pleisse, Parthe, and Elster; 80 m. WNW. of Dresden; pop. (1910) 587,635. It is the seat of the governmental division of the same name, and is divided into three sections—the old inner town, the center of the industry and wealth of the city; the beautiful promenades, which, surrounding the inner city, occupy the place of the old fortifications and join the most important public square of the city; and the suburbs of modern origin and appearance. The inner town contains the market place, with a town-hall erected in the sixteenth century, and other fine old buildings. Among the most interesting buildings of the city are the new theater, the museum, the Augusteum, or main building of the university; the new university library building, and the Pleissenburg, the scene of Luther's famous disputation with Dr. Eck, 1519. The most remarkable among the churches are the Nicolaikirche, built in Gothic style in the twelfth century, and the Thomaskirche, built in the fifteenth century, and containing a beautiful marble altar. The Univ. of Leipzig was founded, 1409; is the second largest in the German Empire; has a strong faculty, and is one of the recognized centers of scholarship in the world. The city is the center of the book trade of Germany; since the twelfth century has been the scene of the most important *Messe*, or fair, of which three are held annually, and is a center of art and music.

Leipzig appears as a town for the first time in history, 1015. Before that time it was an insignificant village, in which Henry I built a castle, 922. During the Middle Ages the fortifications of the city protected its commerce, and Charles V increased the privileges of its *Messe*. In the time of the Reformation it supported the new doctrine, but suffered much from the war, and afterwards felt more severely the Thirty Years' War. Tilly took it, 1631; later the Swedes and the imperials held it alternately. The Seven Years' War destroyed its enterprise, but its favorable location enabled it to recover rapidly. During the wars

of Napoleon new calamities came over it. From October 16 to 18, 1813, the great battle in which Napoleon was defeated raged in and around it, and all great movements in Germany have affected it more or less on account of its central position.

Leisler (lís'lér), Jacob, d. 1691; American colonial insurrectionist; b. Frankfort, Germany; removed to N. America, 1660, as a soldier of the Dutch West India Company; was some time stationed at Albany, where he engaged in trade with the Mohawk Indians, and acquired some wealth; and became one of the commissioners of the Court of Admiralty in New York, 1683. On May 31, 1689, he headed an insurrection for the preservation of the Protestant religion, took the fort, declared for the Prince of Orange, and planted within the fort a battery of six guns, which gave origin to that name as still applied to the public park at the lower end of Manhattan Island. In December he assumed the style of a royal governor; early, 1690, sent a small fleet against the French at Quebec; on the appointment of Sloughter as governor, Leisler refused to surrender the fort and the government (1691) until convinced of the former's identity and authority. For this constructive treason Leisler was soon after imprisoned, with his son-in-law and secretary, Jacob Milborne, and both were condemned and executed. The memory of Leisler was rehabilitated by an act of Parliament (1695), an indemnity was given to his heirs (1698), and his bones and those of Milborne were honorably buried in the Dutch church.

Leith (lèth), town in county of Edinburgh, Scotland, on the Firth of Forth; 2 m. from Edinburgh, whose port it is, and with which it is connected by continuous rows of houses; its harbor is excellent, is 25 ft. deep, has a breakwater, and contains two wet and three dry docks. Its shipbuilding, both in wood and iron, and its manufactures of rope, sailcloth, soap, etc., are considerable, and it imports large quantities of grain, wine, hemp, timber, and tobacco. Pop. (1901) 76,667.

Leitha (lí'tā), river which rises in lower Austria; forms for some distance the boundary between the two divisions of the Austro-Hungarian Empire; breaks through the Leitha Mountains, which rise from 1,500 to 2,000 ft., into Hungary, and joins the Danube at Altenburg.

Leitmeritz (līt'mér-its), town of Bohemia; on the Elbe; 33 m. NW. of Prague; is partly fortified; is the capital of a most fertile circle which is called the Bohemian paradise, and has a magnificent cathedral, much trade and industry, and important salmon fisheries. The best Bohemian wines and beer are produced in this district, and much of the Bohemian glass is polished here.

Leitner (līt'nér), Gottlieb Wilhelm, 1830-99; Hungarian Orientalist; b. Pest; learned the classical languages; settled with his father in Turkey, where he became proficient in Turkish, Arabic, and modern Greek; was interpreter to

the English commissariat during the Crimean War, after which he went to London, was naturalized as a British subject, and became Prof. of Oriental Languages and Mohammedan Law in King's College. In 1864 he was appointed director of a college at Lahore, in the Punjab. From 1866 to 1868 he was engaged in an exploration of Tibet and other countries N. of the Himalayas, and was the first to make known the remarkable country of Dardistan, with its interesting group of languages. At a later date he extended his philological researches to the languages of Kabul, Kashmir, and Badakhshan, excavated an important series of Græco-Buddhist sculptures, and exhibited at the Vienna Exposition of 1873 an extensive collection of central Asiatic antiquities.

Lejean (lè-zhān'), **Guillaume**, 1825-71; French traveler; b. Finesterre; explored European Turkey, 1857, and the upper and White Nile, 1860-61; was appointed consul in Abyssinia, 1862; was imprisoned and expelled by King Theodore, 1863; went to Kashmir, 1865, but failed to reach Bokhara, and resumed his travels in Turkey; published "Voyage to the Two Niles."

Le Jeune (lè zhèn'), **Paul**, 1592-1664; French missionary, diocese of Châlons, France; went to Canada, 1632, as first superior of the Jesuit missions after the country was restored to France; remained till 1639; subsequently in France became procurator of the foreign missions; author of a description of Canada and its native tribes in seven volumes, and several pious works.

Leland, **Charles Godfrey**, 1824-1903; American author; b. Philadelphia; was admitted to the bar in Philadelphia, but did not practice; for many years resided chiefly in Europe; works include "Meister Karl's Sketch Book," "Pictures of Travel," "Hans Breitmann's Ballads," "Egyptian Sketch Book," "The English Gypsies and their Language," "Pigeon English," "Poetry and Mystery of Dreams," "Legends of Birds," "English Gypsy Poetry," "Gypsy Sorcery and Fortune Telling."

Leland Stanford Junior University, coeducational and nonsectarian institution at Palo Alto, Cal.; chartered 1885; opened 1891; erected and endowed by Leland Stanford and his wife in memory of their only child, who died 1884. The grounds consist of about 9,000 acres, partly lowland and partly rising into the foothills of the Santa Cruz Mountains. In addition to this estate, the grant of endowment conveyed to the university an estate at Vina, in Tehama Co., of 59,000 acres, and another at Gridley, in Butte Co., of 22,000 acres. Other lands in different parts of the state were afterwards added. At the time of Senator Stanford's death the endowment of the university approximated \$30,000,000, of which about two thirds was in interest-bearing securities. During the lifetime of his widow and by her will the endowment was largely increased. The buildings reproduce on a most extensive scale the architecture of the old Spanish missions of California, and would require a volume for adequate description. The earthquake that visited San Francisco and vicinity, April, 1906,

left a disastrous impress on several buildings of the university's magnificent cluster. The general scope of the institution, as stated in the charter, is "that of a university, with such seminaries of learning as shall make it of the highest grade, including mechanical institutes, museums, galleries of art, laboratories, and conservatories, together with all things necessary for the study of agriculture in all its branches and for mechanical training, and for the studies and exercises directed to the cultivation and enlargement of the mind." The university had (1910) 160 professors and instructors, and 1,744 students in all departments.

Leleges (lèl'è-jéz), ancient people, who appear in the early traditions of the W. coast of Asia Minor, of the islands of the Ægean Sea, and of various countries of Hellas and Peloponnesus, but whose history is involved in great obscurity. They seem to have been of Pelasgian race.

Lelewel (lèl-év'èl), **Joachim**, 1786-1861; Polish historian; b. Warsaw; was Prof. of History at Wilna, but, 1822, was removed for his revolutionary language. In 1830 he was elected to the Diet, and after the outbreak of November 29th was a member of various revolutionary governments. After the fall of Warsaw he went to Paris, and was placed at the head of a Polish democratic committee, but was ultimately banished from France. He took up his residence at Brussels, where he lectured on history at the new university, and lived a life of self-imposed poverty and incessant literary labors. Among his numerous works, in Polish, French, and German, are "Treatises on Geographical and Historical Subjects," "Numismatics of the Middle Ages," "Poland in the Middle Ages," "Geography of the Arabs," and "Geography of the Middle Ages," with an atlas engraved by himself.

Lely (lèl'), **Sir Peter**, 1617-80; English painter; b. Soest, Westphalia; went to England, 1641, and devoted himself almost exclusively to portrait painting, in which he soon surpassed all his contemporaries. He painted the portrait of Charles I, and became court painter to Charles II, who knighted him. He excelled in female portraits, and painted a celebrated series of the "Beauties of the Court of Charles II." "Susannah and the Elders" is the best known of his historical pictures.

Lemaître (lèh-mâtr'), **Frédéric**, 1798-1876; French actor; b. Havre; first appeared on the stage, 1823; became famous as *Robert Macaire* in the play of that name, of which he was one of the authors, 1834. Excepting in the Théâtre Français, he won successive victories in most metropolitan theaters, and especially at the Ambigu Comique in comic and tragic parts, and he was often called the Talma of the boulevards. Among his grandest performances, besides *Robert Macaire*, were *Don César de Bazan* and *Toussaint l'Ouverture*.

Leman (lè-mān'), **Lake**. See GENEVA, LAKE OF.

Le Mans (lè mǎn'), capital of the department of Sarthe, France; on the Sarthe, here

crossed by four bridges; has a beautiful cathedral, begun 1217, a townhall, built 1757, vestiges of Roman buildings dating from the second century, a theological seminary, lyceum, normal school, library, museum of antiquities, and several learned societies; chief manufactures are linen fabrics, bells, machinery, leather, and stained glass. Pop. (1906) 65,467. In 1793 the republican army won an important victory near Le Mans, and, January, 1871, the Germans defeated the French in a decisive battle.

Lemberg, capital of Galicia, Austria; on the Peltov; is the seat of the government and of Roman Catholic, Armenian, and Greek archbishoprics; has a cathedral, built, 1370, by Casimir the Great; two beautiful synagogues, many splendid palaces, and other magnificent buildings; its university is attended by over 2,250 students and has over 160 instructors. Its manufactures are not important, but its trade, though to a great extent merely transit, is very extensive. In 1914 Lemberg was captured by the Russians; it was retaken by the Austro-Germans in June, 1915; and was shelled in March, 1919. Pop. (1910) 206,574.

Lem'nos (modern LIMNI), island of the Grecian Archipelago, belonging to Turkey; in the Aegean Sea, between Mt. Athos and the coast of Asia Minor; area, about 176 sq. m.; is of very irregular outline; is rocky and hilly, and bears strong marks of volcanic action, but the valleys are fertile, and the ancients relate that the mountain Mosychlus was sometimes an active volcano. This island, so famous in history and mythology, now contains some 30,000 inhabitants, mostly Greeks. Its chief town, Castro, is the seat of a bishop. Pop. abt. 30,000.

Lem'ming, a name given to the small rodents of the genus *Myodes*, found in the N. regions of both hemispheres. They have rounded heads, obtuse muzzles, round, stumpy



LEMMING.

tails, and five toes on each foot. They are vegetable feeders and live in burrows. The Norway lemming (*M. lemmus*) is about 5 in. long, clothed in soft, yellowish-brown fur, marked with dark brown and black. It is abundant in the highlands of the interior of

Norway and Sweden, and is remarkable for the migrations which it makes at intervals of from ten to twenty years. The impelling cause of these migrations seems to be great increase in numbers, coupled with lack of food. The lemmings move gradually from the highlands toward the sea in countless multitudes, traveling mostly by night. Once started, nothing stops them; they swim lakes and rivers, climb hills, and struggle through marshes, many perishing on the way. Although preyed upon by all manner of rapacious animals—bears, weasels, hawks, and owls—the numbers of the killed are largely replaced by others born as the host moves on. When the sea or the Gulf of Bothnia is reached the lemmings plunge in, and here all ultimately perish.

Le Moine (lè mwān'). See **LE MOYNE**.

Le Moine (lè moīn'), Sir James MacPherson, 1825–1912; Canadian historian and naturalist; b. Quebec; admitted to the bar, 1850; after 1868, held an important office in the inland revenue department; devoted more than thirty years to researches and works on early Canadian history; knighted, 1897; chief works, "L'Ornithologie du Canada," "Legendary Lore of the Lower St. Lawrence," "Les Pêcheries du Canada," "Chronicles of the St. Lawrence," "Historical Notes on Quebec," "Picturesque Quebec," "Canadian Heroines."

Lem'on, Mark, 1809–70; English humorist; b. London; was one of the founders of *Punch*, and from 1843 till his death was its chief editor; was also a contributor to other periodicals; published several novels; and produced many plays, farces, and melodramas, the best known of which is "The Serious Family."

Lemon, tree which grows wild in the N. of India, and has long been in cultivation among the Arabs, who introduced it in various parts of Asia and Africa. In the Middle Ages it was introduced into Europe. It is now naturalized in the W. Indies and other parts of America. More than thirty varieties are enumerated, differing in size, shape, thickness and roughness of skin, and the size and form of the nipple at the end. Very fine lemons are produced in Florida and California, but much less attention has been given to their cultivation than to that of the orange. The lemon is valued for its acid juice and its aromatic rind, and its domestic uses in making cooling drinks and for flavoring are well known. The juice contains nearly 2 per cent of citric acid, with mucilage and bitter extractive matter. The oil of lemons is contained in receptacles in the outer portion of the rind, and is largely used by confectioners and cooks for flavoring. The extract sold for domestic use is a more or less concentrated solution of the oil in alcohol.

Le Moynes, Charles (SEIGNEUR DE LONGUEIL), 1626–83; French pioneer; b. Normandy; went to Canada, 1641; lived some years among the Hurons; obtained extensive land grants; was distinguished in wars against the Iroquois under Courcelles and Tracy; created, 1668, Seigneur de Longueuil, to which title that of Châteauguay was afterwards added; was for sometime military commander of Montreal.

Le Moyne, Charles (BARON DE LONGUEIL), 1656-1729; French-Canadian military officer; b. Montreal; eldest son of the preceding; served in youth in the French army in Flanders; promoted colonization to Canada; was wounded in the repulse of Sir William Phipps's assault on Quebec, 1690; made Governor of Montreal and baron, 1700; commander in chief of the colonial forces; fought against the English expedition of Walker and Nicholson, 1711; in command at Three Rivers, 1720, and at Montreal, 1724-26.

Lemprière (lēm-prē-ār'), **John**, abt. 1765-1824; English educator and classical scholar; b. island of Jersey; took orders in the Church of England; was head master of classical schools at Abingdon and Exeter; became rector of Meath, 1811, and Newton-Petrock, Devonshire, 1823. He published, 1788, a small "Bibliotheca Classica," or classical dictionary, much enlarged in the second edition of 1792, which has since been many times reprinted in Great Britain and the U. S. It was the basis of Anthon's well-known classical dictionary.

Lemur, general name for the members of the suborder *Prosimia*, a division of the or-



RING-TAILED LEMUR.

der *Primates*, containing the half apes. The name lemur was applied to these animals by Cuvier on account of their nocturnal habits



SPECTRAL LEMUR.

and spectral appearance. They differ from the monkeys in many important anatomical de-

tails; also externally. The head of the lemurs is usually long and foxlike, the fur is soft, thick, and woolly, and the coloration is frequently soft and delicate. The great majority of the species are confined to Madagascar, but a few inhabit Africa and India and the larger adjoining islands as far E. as Celebes. The ruffed lemur is sometimes black and white, and sometimes of an almost uniform reddish-brown. It is about as large as a cat.

Lemures (lēm'ū-rēs), in Roman mythology, the spirits of the dead, which, either because of their own guilt or the neglect of proper observances on the part of their friends, could not find rest in the lower world, and so still haunted the scenes of life. Their influence was believed to be harmful, and to propitiate them an annual festival called *Lemuria* was celebrated with expiatory rites on the nights of May 9th, 11th, and 13th.

Lemu'ria, tract of land supposed to have formerly extended from Africa and Madagascar to southernmost India. The Seychelles and Maldiv Islands and the Chagos Banks are considered to be portions of this submerged Lemuria.

Le'na, one of the principal rivers of Siberia; rises near Irkutsk, in the mountains N. of Lake Baikal, and enters the Arctic Ocean through several branches; receives the Vitim, Olekma, and Aldan from the right, and the Viliui from the left; passes by Olekminsk and Yakutsk; and is open from May to November; length, 2,880 m., of which 2,680 (from Yigalova down) are navigable.

Lenine, Nikolai, (real name VLADIMIR UTULYANOV), 1870- ; a Russian radical Social Democrat; chief leader of the Bolsheviks; elected to the Second Duma, but soon exiled; headed two Bolshevik uprisings in Petrograd in 1917; latterly was in hiding; was closely associated with LEON TROTSKY (*q. v.*, real name LEBER BRAUNSTEIN), Russian Anarchist-Socialist, in the overthrow of Alexander F. Kerensky, for several months in 1917 the Russian premier.

Len'nep, Jacob van, 1802-68; Dutch poet and novelist; b. Amsterdam; practiced law with success and held many positions of trust; published numerous works, including "Academic Idylls," "Netherlandish Legends in Rhyme," "The Village on the Frontier," a political farce; "The Adopted Son," and "The Rose of Dekama," novels.

Lenormant (lēh-nōr-māñ'), **Charles**, 1802-59; French art critic and archaeologist; b. Paris; became, 1825, Inspector of Fine Arts; accompanied Champollion the Younger to Egypt, 1828; took an active part as a member of the commission for exploring the Mores; became after the revolution of 1830 chief of the section of fine arts in the Ministry of the Interior, keeper of books and antiquities at the Royal Library, professor at the Sorbonne (1835), and Prof. of Egyptian Archaeology at the College of France. He wrote numerous treatises on art, numismatics, ceramics, and Egyptology.

Lenormant, François, 1837-83; French archaeologist; b. Paris; son of Charles; became, 1874, Prof. of Archaeology at the Bibliothèque; works include "Manual of the Ancient History of the East," "Magic Among the Assyrians," "The Money of Antiquity," "The First Civilizations."

Len'ox, James, 1800-80; American philanthropist; b. New York; son of Robert Lenox, merchant, from whom he inherited a large fortune; during a visit to Europe began collecting rare books; spent the greater part of his life in gathering a library and paintings, which, together with numerous valuable manuscripts, engravings, marble statues and busts, and curios, he presented to New York City, 1870, together with the costly building which he had erected for their keeping.

Lens, a piece of glass or other transparent substance having its two surfaces so formed that the rays of light in passing through it have their direction changed, and are made to converge or diverge from their original parallelism, or to become parallel after converging or diverging. When a ray of light passes in an oblique direction from one transparent medium to another of a different density, the direction of the ray is changed both on entering and leaving; this influence is the result of the well-known law of refraction, that a ray of light passing from a rare into a dense medium is refracted toward the perpendicular, and *vice versa* (Fig. 1). The ray *k e* falling perpen-

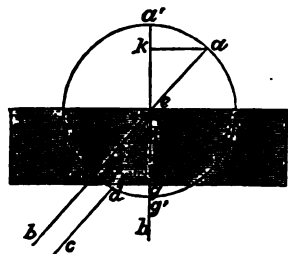


FIG. 1.

pendicular *a' k h*, *a e* is the incident ray, and the angle *a e k* the angle of incidence with the perpendicular *k h*. From *e* to *d* is the refracted ray, and the angle *d e g* is the angle of refraction to the perpendicular. After the change in the course of the ray has taken place in the glass, we find that when the ray is allowed to pass out from the glass, as at *d c*, another bending takes place, by means of which the course is made parallel with the incident ray *a e*, only its course is shifted a little to one side. With any radius, as *d e*, describe a circle from the center *e*; then the angle of incidence *a e k* is measured by the arc *a a'*, and the arc *g' d* measures the angle of refraction *g e d*. The line *a k* equals the sine of the angle of incidence, and *d g* equals the sine of the angle of refraction. The sine of the angle of incidence (in a given transparent medium) has always the same ratio to the sine of the angle of refraction with all degrees of obliquity of the incident ray.

Lenses are of various forms, and change the course of light passing through them according to their special figure. In Fig. 2 are represented the different shapes of lenses. *a* is a simple, parallel glass, *b* a meniscus or concavo-convex lens, *c* a double concave, *d* a plano-concave, *e* a double convex, and *f* a plano-convex. The material employed in the construction of lenses for optical instruments is generally crown glass, which contains very little lead, and flint glass, which contains much lead



FIG. 2.

and has a greater refractive power. Owing to the supreme importance which optical instruments possess in the advancement of science, great attention has been given to lens making. The present very high state of the art, as exhibited in the best telescopes and microscopes, has been reached (1) by the development of the process of grinding to a degree of extraordinary precision; (2) by improvements of glass making, which make it possible to secure great uniformity and homogeneity with freedom from strains and of other optical imperfections due to internal strains; (3) by the introduction of new varieties of glass possessing the optical properties demanded for the construction of achromatic and aplanatic systems of lenses. See ABERRATION.

Lent, the fast of forty days (not counting Sundays) which begins with Ash Wednesday and ends with Easter Sunday. It is observed by the Eastern, Roman, Anglican, Lutheran, and some other churches. It commemorates the forty days' fast of Christ in the wilderness. The Greek Church lengthens it to forty-eight days.

Len'til, annual leguminous herb of the Old World, the *Ervum lens*, resembling the vetch



LENTIL.

or pea, and extensively cultivated as food. The seed is the part employed. It is smaller,

more nutritive, and more digestible than the pea. There are many varieties. It grows well on the poorest lands. The vine is small, but affords excellent fodder for sheep, horses, and cattle.

Len'tulus, d. 63 B.C.; Roman consul; member of the gens Cornelia; was consul in 71, but was ejected, 70, on account of his scandalous private life; united himself with Catiline's band of conspirators; with them was condemned without trial, and put to death in the public prison.

Lens (lěnts), **Oskar**, 1848-. ; German explorer; b. Leipzig; made mineralogy and geology his scientific specialties; after geological researches in Hungary, Slavonia, Bohemia, and the W. Alps, he went to Africa (1874) as a member of the scientific expedition of the German African Company of Berlin; spent three years studying the regions adjacent to the coast between Gaboon and the Kongo. The journey that made him famous was carried out (1879-80) at the expense of the same company. In the disguise of a Mohammedan merchant he crossed the W. Sahara, spent several weeks in Timbuktu, which had not been visited by a white man for many years, and crossed the W. Sudan by an unexplored route to the mouth of the Senegal River. He corrected some erroneous notions with regard to the Sahara. His most important works are "Sketches from West Africa," "Timbuktu: Journey Through Morocco, the Sahara, and Sudan," and "Wanderings in Africa."

Le'o, name of thirteen popes, of whom the following are most important: **LEO I** (the Great), saint, abt. 390-461; b. Rome; succeeded Sixtus III, 440; opposed the Pelagian, Manichæan, Priscillian, and Eutychian heresies; endeavored to restore harmony and discipline among the churches of Africa, Gaul, and Italy; labored with ability to promote the papal supremacy; induced Attila, marching against Rome, to spare the city; failed to prevent its pillage by Genseric, 455, but secured modification of the attack; afterwards devoted himself to redeeming the captives and relieving the public distress; was excommunicated by the "Robber Synod," 449; presided over a general council at Chalcedon, which annulled the acts of that convocation; left many sermons and epistles; succeeded by Hilarius I; day, April 11th. **LEO II**, saint, abt. 750-816; b. Rome; succeeded Adrian I, 755; crowned Charlemagne Emperor of the West, and freed Rome from Byzantine domination; was maltreated by an armed band of conspirators and imprisoned; released by the citizens, fled to Paderborn; received with honor by Charlemagne, who gave him an escort back to Rome; distinguished for his magnificence in building and adorning churches; succeeded by Stephen IV; day, June 28th. **LEO IX** (Bruno), 1002-54; b. Alsace; cousin german to Emperor Conrad the Salic; elected at Diet of Worms as successor to Damasus II, 1049; was under the influence of Hildebrand, afterwards Gregory VII; visited France, Italy, and Germany in endeavor to reform discipline in the Church; held councils against simony and concubinage;

raised an army to oppose the Normans, but was defeated, captured, and imprisoned for ten months; during his reign he and the Patriarch of Constantinople excommunicated each other, and the Berengarian controversy caused much trouble.; succeeded by Victor II.

LEO X (Giovanni de' Medici), 1475-1521; b. Florence; son of Lorenzo the Magnificent; became cardinal when seventeen years old; exiled with the other Medici, 1494; served against the French as legate and field marshal; taken prisoner at Ravenna, 1512; aided in restoring the Medici to Florence, 1512; succeeded Julius II, 1513; pontificate memorable for the splendor of the papal court; his extensive patronage of learning and art, the reorganization of the Univ. of Rome, and the establishment of a committee under the presidency of Lascaris for the publication of Greek manuscripts; the opening of the Reformation, which he was inclined to regard as scarcely more than a dispute between rival religious orders; the confirmation and extension of the Spanish power in Italy; and the final suppression of the Florentine Republic. He was well versed in literature and proficient in music. He employed Michelangelo and Raphael in the execution of some of their greatest works. His munificence might well entitle the reign of Leo X to rank as the golden age of Italian art and letters. Succeeded by Adrian VI.

LEO XIII (Giacchino Vincenzo Pecci), 1810-1903; b. Carpineto; became apostolic delegate at Benevento, Perugia, and Spoleto; nuncio to Belgium, 1843; Bishop of Perugia, 1846; cardinal, 1853; Chamberlain of the Sacred College, 1877; succeeded Pius IX, 1878; restored the hierarchy in Scotland; negotiated amicable relations with Germany; gave the Irish bishops greater latitude of speech; denounced methods of Irish leaders in the famous "Plan of Campaign"; exerted his influence for the suppression of African slavery; refused the income voted him by the Italian Parliament, considering himself a prisoner at the Vatican; protested against the unveiling of a statue of Bruno in Rome; and against heresy and godless schools; and opened the archives of the Vatican to the scholars of the world for historical research. His pontificate of twenty-five years brought the papacy and his own powerful personality prominently before the world, and he came to be looked upon as one of the great spiritual leaders and guiding thinkers of the time.

His encyclicals commanded the respectful consideration of the whole Christian world. The most important were those entitled "The Church as the Mother of True Civilization," "Dangers from Socialism, Communism, and Nihilism," "Restoration of Philosophy According to the Philosophical Principles of St. Thomas Aquinas," "Christian Marriage," "Origin of Civil Authority," "Human Liberty," "The Most Important Duties of Christians in the State," "On the Condition of Labor," "The Unity of the Faith," and "The Study of Holy Scripture." Two apostolic letters excited much comment in the English-speaking world. One urged the return to the

Church of the English people who had separated from it; the other was a disapproval of "those views which, in their collective sense," are called by some 'Americanism,'" which was inspired by the publication of a biography of Father Isaac Hecker, of New York, founder of the order of Paulist Fathers, in which it was argued that to attract those who differ from her the Roman Church should shape her teachings more in accord with the spirit of the age. He was succeeded by Pius X.



LEO.

Leo, sign of the zodiac, which the sun enters abt. July 22d and leaves abt. August 23d. The constellation of the same name, one of the finest in the heavens, occupies the zodiacal region corresponding to the sign Virgo, and contains many remarkable nebulae.

Leo Africa'nus (originally AL-HASSAN IBU MOHAMMED), abt. 1485-1526; Moorish traveler; b. Granada, Spain; in youth resided four years in Timbuktu; afterwards traveled through several countries of N. and central Africa, penetrating Bornu to Nubia, descending the Nile, and extending his explorations into Persia. Returning from Constantinople by sea, 1517, he was captured by corsairs and taken to Rome, where he became a Christian, was patronized by Pope Leo X, whose name he took; was made Prof. of Arabic, and wrote his famous "Description of Africa" in Arabic.

Leochares (lă-ôk'ă-réz), Athenian sculptor (350 B.C.), who cooperated with Scopas, Bryaxis, and Timotheus in the sculptures on the sides of the mausoleum at Halicarnassus. Besides statues of the gods (Zeus, Apollo, Ares, etc.), he made portrait statues also (Isocrates, Alexander the Great, etc.); he assisted Lysippus in his group representing Alexander in the lion chase. He made in bronze a group representing the rape of Ganymede by the eagle of Zeus, a marble copy of which is in the Vatican.

Leon (lă-ôn'), Fray Luis Ponce de, 1527-91; Spanish theologian and poet; b. Belmonte, now Castile; became an Augustinian friar; obtained, 1561, the Chair of Theology in the Univ. of Salamanca, and later that of the Sacred Scriptures; for nearly five years (1572-76) was imprisoned by the Inquisition under the charge of heresy; author of "Poems," "The Perfect Lady," a commentary on the Book of Proverbs, a Latin exposition of the Song of Solomon, a Spanish version of the song in octaves, etc.

Leon, city in State of Guanajuato, Mexico; 5,862 ft. above the sea; 258 m. from Mexico City; is noted for its manufactures of saddlery and leatherwork; it also makes coarse woolen and cotton goods, soap, and cutlery. The place was founded 1576. Pop. (1900) 63,263.

Leon, city of Nicaragua, capital of department of same name; 50 m. WNW. of Lake Managua, and about the same distance from

the Pacific coast at Corinto. The most notable building is the cathedral. Connected with it is the College of San Roman, founded 1678, and long one of the most celebrated institutions of learning in America. Leon was originally founded (1523) by Francisco Hernandez de Cordoba, on the W. side of Lake Managua, and changed to the present site, 1610. It was the capital of the colonial province and of the republic until 1870. The Indian suburb of Subtiaba is really the original town, having existed before the conquest. Pop. (1907) 62,569.

Leonar'do da Pisa (pé'zä), Leonardo Bonacci, often FIBONACCI, b. abt. 1175; Italian mathematician; b. Pisa; traveled extensively in the East to study different mathematical systems, and was the first to introduce algebra into Europe, where he made the Arabic system of arithmetic better understood. He wrote "Practica Geometriae," "Liber Abbacis," using the word abacus as a general designation of arithmetic, and a treatise on the squares of numbers.

Leonardo da Vinci (vin'ché), 1452-1519; painter, sculptor, architect, engineer, inventor, and man of science; b. at Vinci, near Empoli, in the Val d'Arno. He was the natural son of one Piero, an obscure notary of Florence. His father took him home and gave him a good education. The boy showed such an aptitude for the arts that Piero placed him with Verrocchio, a distinguished Florentine painter and sculptor, with whom he remained from his fourteenth to his twentieth year. In 1480 or 1483 he went to Milan, having offered his services to the Duke Lodovico il Moro in a remarkable letter, of which an autograph copy exists in the Ambrosian Library at Milan. In this letter Leonardo appears less as an artist than as a military engineer; he declares himself prepared to undertake any work that may be required for military offense or defense, and only at the end of his letter refers to his accomplishments as a sculptor, architect, and painter. In the service of Lodovico he executed several important works—the model for the equestrian statue of Lodovico Sforza, the duke's father; the plans for the Martesana Canal, and the famous "Last Supper," a fresco in oils painted on the wall of the refectory of the convent of Sta. Maria delle Grazie. The fresco, owing partly to ill treatment and to the process by which it was painted, is so damaged that it cannot be said to exist. In 1499 Leonardo returned to Florence, but after a short stay he entered the service of Cæsar Borgia, who made him his chief engineer. At this time he was invited by the signiory of Florence to paint the walls of the council hall of the Palazzo Vecchio in conjunction with Michelangelo. He began the work, but wearied of it, and abandoned it on the invitation of Charles d'Amboise, who called him to Milan, where he governed as the lieutenant of Louis XII of France. Leonardo went to Rome in the company of Giulian de' Medici, who was to assist in the consecration of his brother, Leo X, as pope. He found no employment under Leo, and hearing that Francis I had en-

tered Lombardy, he hastened to join that monarch. Leonardo's health failed after his arrival in France, and, beyond some engineering projects, he accomplished nothing during the three years and a half that elapsed between his coming and his death. The authentic existing paintings of Leonardo are few in number, and of these the Louvre possesses the finest. These are the "Virgin of the Rocks," the "Portrait of Madonna Lisa del Giocondo" (called "Mona Lisa" or "La Jaconde"), the "Virgin on the Knees of St. Anna," and the "John the Baptist."

Leoncavallo (lā-ōn-kā-vāl'lo), **Ruggiero**, 1858-1919; Italian composer; b. Naples; at the age of sixteen became a professional pianist; inspired by Wagner's works and encouraged by him, turned his attention to composition. He has written the operas "Tommaso Chatterton," "I Medici," "Gerolamo Savonarola," and "Cæsar Borgia," these forming a trilogy "Crapuscolum"; "Songe d' une nuit d' été"; "I Pagliacci," which established his fame; "La Bohème"; a symphonic poem, "Serafitus-Serafitia," and other works.

Leonidas (lē-ōn'ī-dās), King of Sparta; succeeded his half brother, Cleomenes, abt. 490 B.C., and was sent in the spring of 480, when the Persians had conquered Macedonia, to defend the defiles of Thermopylæ, between Mt. Ceta and the Malia Gulf. For two days the Greeks resisted the barbarian host with great valor; the Persian losses were enormous. At daybreak on the third day Leonidas learned that the Persians had found a pathway, shown to them by a traitor, and were coming in masses across the mountain. There was still time to retreat; but, having sent away his auxiliary troops, Leonidas with his 300 Spartans remained in the defiles, and, occupying a small hill in the center of the position, they fought to the last man.

Leon' Is'land, island on the S. coast of Spain, in the Atlantic, 10 m. long by 2 broad, on which is the city and port of Isla de Leon (also called San Fernando). The city was, 1810, the capital of Spain under the regency, and was the scene of the first constitutional movement of 1820. It is strongly fortified, has two hospitals, several convents, and an excellent observatory.

Leonna'tus, Macedonian general; b. Pella, of princely stock; became one of the bodyguard of Philip, and pursued and slew Philip's murderer. Afterwards he became one of Alexander's generals and helped to save his life, besides distinguishing himself in India, both as general and civil governor. After his return, Alexander rewarded him with a golden crown. On the division of the empire he received Phrygia Parva as his share. During the Lamiian War he marched from Phrygia to the aid of Antipater, and was killed in the battle near Lamia.

Leopard (lēp'erd), large, spotted member of the cat family, the *Felis pardus* of Linnaeus, found throughout the greater part of Africa, S. Asia, and the islands of Ceylon, Java, Sumatra,

and Borneo. The color varies, according to the nature of the region, from pale fawn to deep buff, fading into white on the under side of the body and inner portions of the limbs. The coat is thickly marked with spots of black,



LEOPARD.

or deep brown, arranged on the back and sides in rosettes. Totally black individuals, cases of melanism, sometimes occur in S. Asia. The body of the leopard is about 4 ft. long, the tail 3.

Leopardi (lā-ō-pār'dē), **Giacomo** (Count), 1798-1837; Italian poet; b. Recanati, Ancona; at age of sixteen wrote a commentary on Porphyry's "Life of Plotinus," and about the same time a dissertation on the life and writings of the principal rhetoricians of the second century; at age of twenty was celebrated throughout Italy for the eloquence and energy of his burning patriotic strains. As a critic Leopardi ranks with the most eminent of modern Italy. Of his poems his ode "To Italy" is the most widely known.

Le'opold I, 1790-1865; King of Belgium; son of Duke Francis of Saxe-Coburg; was made a general in the Russian army after the marriage of his sister to the Grand Duke Constantine; accompanied Alexander I to Vienna and Paris, 1814; and was married, 1816, to the Princess Charlotte Augusta, heir apparent of Great Britain (d. 1817). In 1830 he refused the crown of Greece, but, 1831, accepted that of Belgium, and married, 1832, a daughter of Louis Philippe.

Leopold II, 1835-1909; King of Belgium; son of King Leopold I and Queen Louisa, daughter of Louis Philippe of France; was married, 1853, to Maria Henriette, a daughter of the Archduke Joseph of Austria, and ascended the throne, December 10, 1865. He became, 1885, sovereign of the Independent State of Kongo.

Leopold I, 1640-1705; Emperor of Germany; b. Vienna; son of Ferdinand III and Maria Anna of Spain; at the death of his elder brother, 1655, became King of Hungary, and, 1658, succeeded his father as King of Bohemia and Emperor of Germany. He waged three wars with France, the first was ended by the Peace of Nymwegen in 1678, the second by the Peace of Ryswick, 1697, and the third was

the War of the Spanish Succession. The point at issue between Austria and Turkey was Transylvania. The Turks held it, and the Hungarians demanded it. In 1682 the war began, and the Turks broke into Hungary. In 1683 Leopold received troops from the German Empire, Sweden, and France, and money from the pope and the Italian states, and August 1, 1684, Montecuccoli succeeded in routing the Turkish army at St. Gothard, on the Raab. On August 10th an armistice of ten years was concluded, in which, however, the Turks retained Transylvania. Soon after disturbances arose in Hungary from the contest between the National Protestant and the Austrian Catholic parties. Leopold treated his political adversaries with the utmost harshness, and the result was a formidable insurrection under the leadership of Tökölyi, 1682. The Hungarians solicited Turkish aid, and on July 14, 1683, an army of 200,000 men laid siege to Vienna. Leopold had fled, and the city would have fallen, if the Polish king, John Sobieski, had not completely routed the besieging army. The Hungarians submitted, and at the Diet of Pressburg, 1687, the Hungarian crown was declared hereditary in the family of Hapsburg.

Leopold II, 1747-92; Emperor of Germany; b. Vienna; second son of Francis I and Maria Theresa; succeeded his father as Grand Duke of Tuscany, 1765, and his brother in Austria and Germany, 1790. He pacified Hungary, quelled the insurrection in Belgium, concluded peace with Turkey at Sistova, 1791; and re-established the friendly relations with Prussia by the Congress at Reichenbach, 1790.

Leopold II, 1797-1870; Grand Duke of Tuscany; son of the Grand Duke Ferdinand III. He began his rule, 1824, under the name of Leopold II. In 1847 he granted a free constitution; 1849, had to flee to Naples, whence he was recalled shortly after by his own subjects; 1859, fled with his family to Vienna; and abdicated in favor of his son. His dominions were incorporated with the Kingdom of Italy in consequence of a popular vote, and he died an exile at Brandeis, Bohemia.

Le'opoldville, chief station of the Kongo Independent State; on the Upper Kongo; founded by Henry M. Stanley, 1881; just above the first of the 235 m. of cataracts in the Lower Kongo, and near the wide expansion of the river known as Stanley Pool. A railway about 250 m. in length connects Stanley Pool with Matadi, about 100 m. from the mouth of the Kongo. Government steamers give public transport service above Leopoldville.

Leon'thenes, d. 322 B.C.; Athenian general, who, after the death of Alexander the Great, headed the league formed for the purpose of driving the Macedonians out of Greece. He routed the Boeotians, who sided with the Macedonians, and then defeated Antipater, the Macedonian general, and shut him up in Lamia, 323. While besieging this city he was wounded by a stone thrown from a rampart, and died two days after.

Leotychides (lê-ô-tik'î-dêz), d. abt. 469 B.C.; Spartan king; ascended the throne, 491, having

conspired against and deposed his kinsman, King Demaratus. In 479 he commanded the Greek navy which won the battle off Mycale. Sent, 470, to reduce the Alcadae, who by Persian influence had once more become masters of Thessaly, he was bribed to return, and fearing for his life fled to Tegea, where he died.

Lepan'to, Gulf of, or Gulf of Cor'inth, inlet of the Mediterranean; 75 m. long and about 16 m. wide; between Peloponnesus and the mainland of Greece; terminates to the E. in the Gulf of Patras, connected with it by the Strait of Lepanto, not more than 1 m. wide. In this gulf was fought (October 7, 1571) the celebrated battle between Don John of Austria, commanding the allied Spanish, Venetian, and papal fleet, and Ali Pasha, commander of the Turkish fleet, in which the former won.

Lepidop'tera. See ENTOMOLOGY.

Lepidosi'ren, vertebrate animal, possessing characters of both fishes and reptiles, and alternately referred by naturalists to one or the other of these classes; was discovered by Dr. Natterer in the Amazon, 1837. The body is



LEPIDOSIREN.

fishlike in form, and it breathes by both gills and lungs, taking in water by the nostrils, and respiring air like batrachians and water like fishes, constituting as near an approach to an amphibious animal as is known to exist.

Lep'idus, Marcus Æmilius, d. 13 B.C.; Roman politician; most conspicuous member of the gens Æmilia; at the breaking out of the civil war, 49, joined the party of Cæsar, who made him his *magister equitum*, and in 46 procured his election to the consulship. He afterwards supported Antony, and became one of the triumvirate with Octavianus and Antony, who in 40 assigned him the province of Africa. In 36 he made an effort to assert his equality of position, but was deserted by his soldiers, and deprived of his province. He was, however, allowed to retain the office of *pontifex maximus* to which he had been elected in 44.

Lepor'idæ, family of rodent mammals including the hares and rabbits; characterized externally by long ears, long hind legs, short upturned tail, rounded muzzle, and nostrils converging toward the median slit which divides the upper lip, and has given rise to the familiar term harelip. The skull is high and compressed, and the upper incisors are arranged in a peculiar manner—two smaller incisors lying back of the two usually present in rodents. Some forty species are recognized, most of them inhabitants of the N. temperate zone.

Lep'rosy, a disease which is endemic in certain countries and met with occasionally in

nearly every large seaport city. In India, China, Syria, Egypt, Norway, W. Indies, and the Sandwich Islands the disease abounds. In New Brunswick and Nova Scotia, Minnesota and Louisiana small colonies of lepers are to be found. The modern leprosy is the same in character in whatever region or climate it occurs, and corresponds with the description of the disease given by early Greek medical writers. The cases of leprosy reported in the New Testament as being cured were not cases of genuine leprosy, but a very common disease of the present day, and characterized now as then by the formation of white scaly patches upon the skin.

Leprosy spread throughout Europe after the crusades, but was by no means as prevalent as has been imagined, since it was doubtless confounded with other diseases.

The symptoms of leprosy are nodules and brownish spots which appear upon the face and other portions of the body. The eyebrows, ears, and air passages are especially apt to become affected, and the victim of the disease usually presents a peculiar and characteristic expression. Loss of sensation in the hands and feet usually occurs, and as the disease progresses ulcers are frequently formed and occasion loss of the fingers and toes. According to the predominance of certain of the above-mentioned symptoms, three forms of leprosy are described in medical works, viz., the macular, tubercular, and anæsthetic forms. Leprosy is contagious, but in a much slighter degree than is commonly believed—often the husband or wife of a leper remains perfectly free. The cause of leprosy has given rise to much discussion. The microscope has revealed a bacillus which can be found in all cases of the tubercular form, and the disease is undoubtedly spread by the inoculation or transmission of this germ.

Lep'tis, name of two cities in Africa, both founded by the Phœnicians. (1) *Greater Lep'tis*, on the coast of Tripoli midway between the Greater and Lesser Syrtis. It had a fine roadstead and artificial harbor, long since choked with sand. The site is still called *Le'bida*. *Leptis* was one of the three cities which gave the name of Tripoli to this region. (2) *Lesser Lep'tis*, in the Carthaginian province of Byzacium, on the coast SE. of Hadrumetum. Its ruins are now called *Lebda*.

Lequesne (lè-kān'), Eugène Louis, 1815-87; French sculptor; b. Paris; was admitted to the bar, 1839, but entered, 1841, the School of Fine Arts; and began to exhibit, 1845. His most prominent works are the "Dancing Faun" in the garden of the Luxembourg, the "Victory" on the tomb of Napoleon, and the "Pegasus" on the front of the new opera house.

Leptocar'dii, a class of animals, containing two genera, but of interest to naturalists on account of the many primitive features which they possess. Formerly they were considered as the lowest vertebrates, but from the fact that they possess no backbone they must be regarded as distinct. They are small trans-

parent fishlike forms occurring in the warmer seas of the globe, where they live buried, except the anterior end of the body, in the sand. The body is flattened, and posteriorly is provided with a fin varying in shape in the different species. The mouth, an oval slit, is surrounded by a cartilaginous ring from which extend a number of stiff processes fringed with tentacles, the whole forming a funnel to convey water and food to the mouth. The nervous system consists of a spinal cord which tapers toward either end. The arrangement of the arteries and veins reminds one of those of the annelids. The blood lacks colored corpuscles. Forms like *Amphioxus* must have occurred in abundance in past times, but owing to the total absence of all hard parts they have left no traces in the rocks. To-day but half a dozen species are known from the whole globe, and they occur in all the warmer parts of both oceans. These are divided among two genera, *Amphioxus* and *Asymmetron*. The latter genus occurs in the W. Indies.

Lérins (lā-rān'), The, several small islands off Antibes, and in the department of Var, France. The largest, *St.-Marguerite*, was the place of imprisonment of the "Man in the Iron Mask," 1686-98. Its fortress, *Monterey*, is now a prison for military convicts and Algerines, and *Bazaine* was here confined, 1874. It was the *Leron* of the ancients. The next smaller island, *St.-Honorat*, is named from *St. Honoratus*, Archbishop of Arles, who founded here in the fourth century the convent of *Lérins*, which became a famous school of theology.

Lermontov (lër'mön-töf), *Mikhail Iurevich*, 1814-41; Russian poet; b. Moscow; entered the army, but wrote a powerful piece on the subject of the death of Pushkin, 1837, for which he was sent to serve in the Caucasus as punishment; was soon reinstated, but on account of a duel with the son of the French ambassador was again sent to the Caucasus. He was killed in a duel by a comrade, who fancied himself caricatured in one of *Lermontov's* works. His most famous poem, "The Demon," was finished at the age of twenty. "Hadzhi Abrek," "The Novice," "Ismail Bey," and "The Song of the Tsar Ivan Vasilevitch" are also fine longer pieces. His one prose work, "A Hero of Our Time," depicts scenery and life in the Caucasus, and introduces the author himself as one of the characters.

Ler'na, in Greek mythology, the swamp S. of Argos, where Heracles killed the *Lernæan Hydra*.

Lero (lā'rō), ancient *Leros*, one of the Ionian Islands of Asia Minor, lying S. of Samos and separated from the N. end of Calymna by a narrow strait (*Diapori*); is 6 m. long and 4 m. wide; very fertile; and has many good harbors, of which the one on the E. side is the best. The island was colonized by *Miletus*, which held the suzerainty over it down to Roman times. Pop. abt. 3,000.

Leroux (lè-rō'), *Pierre*, 1797-1871; French journalist and philosopher; b. Paris; founded the *Globe* newspaper, 1824, as organ of the

philosophers; adhered to the Saint-Simonians, 1831, converting his paper into the organ of their socialistic policy; withdrew after the promulgation of the new doctrines of *Enfantin*. He became, 1832, editor of the *Revue Encyclopédique*, and with Jean Reynaud established, 1838, the *Encyclopédie Nouvelle*, a continuation of the *Encyclopédie* of the eighteenth century; founded, 1841, the *Revue Indépendante*, with Viardot and George Sand. In 1848 he was elected to the National Assembly as an Ultraradical. After the *coup d'état* of 1851 he emigrated, finally settling at Lausanne; after the amnesty of 1869 he returned to Paris. His works include "Humanity, its Principle and its Prospects," "Christianity and its Democratic Origins," "Plutocracy, or the Government of Wealth," "The Beach of Samarez," a philosophic poem.

Leroy-Beaulieu (lé-rwā'-bō-lyō'), Pierre Paul, 1843-1912; French writer on economics; b. Saumur, Maine-et-Loire; settled in Paris to engage in journalism; published, 1868, "On the Influence of the Moral and Intellectual Condition of Laborers Upon their Wages," for which he was crowned by the Academy of Moral Sciences; 1870, was awarded three prizes by the same body for papers entitled "Colonization by Modern Nations," "Local Administration in France and England" "Land Taxation and its Economic Consequences." In 1872 he was appointed Prof. of Finance in the Free School of Political Science at Paris; 1873, he founded *L'Economiste Français*, and became its editor; 1880, was appointed Prof. of Political Economy in the College of France. His other works include "Treatise on the Science of Finance," "The Modern State and its Functions," "Political Economy," "The United States in the Twentieth Century."

Leroy d'Etiolles (dā-tā-ōl'), Jean Jacques Joseph, 1798-1860; French surgeon; b. Paris; 1822, presented to the Academy of Surgery a set of instruments for the operation of lithotomy, and was recognized as their inventor, although Civiale and Amussat claimed priority; numerous other inventions include a forceps for which he received a prize; wrote on lithotripsy, urology, the prostate gland and bladder, etc.

Le Sage (lé sāzh'), Alain René, 1668-1747; French novelist and dramatist; b. Sarzeau, Morbihan; settled in Paris abt. 1690, and began the practice of law, but abandoned it for letters. His first work was mainly translations from Spanish authors; his marked success began with the comedy "Crispin the Rival of His Master," 1707, and the novel "The Devil on Two Sticks," founded on a romance by the Spanish author Guevara, with borrowings from other sources. His comedy "Turcaret," 1709, directed against the financiers, was especially successful. His great work is "Gil Blas de Santillane," after the model of the Spanish picaresque novel. Its realism makes it an important date in the history of the novel, and its influence was particularly great in England. It was published in three parts—1715, 1724, 1735.

Lesbos (lěz'bōs), **Mitylene**, or **Mytilini** (mīt-ā-lě'nē), largest of the islands of the *Ægean* Sea; belonging to Turkey. After the Trojan War it became the chief seat of the Asiatic *Æolians*. Its five cities, Mitylene, Methymna, Antissa, Cressus, and Pyrrha, produced a number of philosophers and poets; Pittacus, Alcaeus, Sappho, Hellanicus, Arion, Theophrastus, Phanias Terpander, and Erinna. Pop. abt. 25,000.

Lescarbot (lā-kār-bō'), Marc (Seigneur de St.-Audebert); abt. 1570-1630; French explorer; b. Vervins; was associated with De Monts in the colonization of Acadia (Nova Scotia), 1605, and was engaged with Poutrincourt in the settlement of Port Royal (now Annapolis) until its abandonment, 1607, when he returned to France. He published, 1609, a "History of New France," giving an account of Cartier's voyages to Canada, of Laudonnière's failures in Florida, and of the enterprise with which he was personally connected, the first attempt at settlement having been made on what is now Boon Island on the coast of Maine.

Les Cayes (lā-kā'), or **Aux Cayes** (ō-kā'), town and port on the S. coast of Haiti; about 80 m. W. of Jacmel; on a bay which forms the finest harbor of that coast; is the capital of the département du Sud. Pop. (1900) 25,000.

Lesghians (lěs'gī-ānz), people of the Caucasus, Asiatic Russia, numbering, according to various estimates, from 460,000 to 680,000, and speaking many languages. Under the influence of Shaml they united into a single political body, and for many years carried on a resistance to Russia. Since 1859 they have been peaceable. Their religion, called Muradism, is a form of Mohammedanism taught by a native prophet, who began his religious career abt. 1830. They inhabit the mountains of W. Daghestan.

Lesley, John, 1527-96; Scottish prelate; became, 1554, Prof. of Canon Law at Aberdeen; opposed the introduction of Protestantism; and on the accession of Mary was appointed Bishop of Ross. His fidelity to the queen involved him in perilous intrigues and misfortunes. After her imprisonment in Bolton castle he took part in the negotiations with Elizabeth, and was afterwards on suspicion confined in the Tower of London. In 1573 he was permitted to go to France, and, 1593, was appointed Bishop of Coutances, Normandy. He wrote several works, in English and in Latin, in defense of Mary, and a history of Scotland.

Leslie, Charles, 1650-1722; Irish controversialist; b. Dublin; son of Bishop John Leslie; took orders in the Church of England, 1680; became chancellor of the Cathedral of Connor, 1687, but by refusing to take the oath of allegiance to William and Mary cut off all prospect of ecclesiastical preferment. He then devoted himself to religious and political controversy, and for thirty years was the leading literary champion of the Jacobites. His works against Jews, Socinians, Presbyterians, Quakers, and Roman Catholics once enjoyed great

fame. He is best known by his "Short Method with the Deists," 1694, the argument of which rests principally on the Christian miracles.

Leslie, Charles Robert, 1794-1859; English painter; b. London; son of a watchmaker of Philadelphia; studied with Benjamin West and Washington Allston; after some attempts at historical painting began a class of humorous subjects, in which for many years he had no superior among English artists, including many familiar scenes from Shakespeare, Addison, Sterne, Pope, Goldsmith, Fielding, Smollett, Cervantes, Le Sage, and Molière. Among his historical pieces are "The Coronation of the Queen" and "The Christening of the Princess Royal." In 1847 he became Prof. of Painting at the Royal Academy, and the substance of his lectures has been published under the title of "A Handbook for Young Painters."

Leslie, Henry David, 1822-96; English composer and conductor; b. London; studied music entirely there. In 1855 formed the celebrated Henry Leslie's choir, which he conducted till 1880, and again, 1885-87. He conducted the Herefordshire Philharmonic Society, 1863, and, 1874, was the director and conductor of the Guild of Amateur Musicians. His compositions are numerous, including a Te Deum and Jubilate in B; "Immanuel," oratorio; "Bold Dick Turpin," operetta; "Judith," oratorio; "Ida," opera; much instrumental music, many songs, part songs, anthems, and other church music.

Leslie, Sir John, 1766-1832; Scottish physicist; b. Largo, Fifeshire; was a tutor in Virginia, 1788-89; settled in London, 1790; became Prof. of Mathematics in the Univ. of Edinburgh, 1805; succeeded Prof. John Playfair in the chair of Natural Philosophy, 1819, which he held till death; knighted, 1832. From 1809 to 1822 he published a series of text-books in geometry and the higher mathematics, and from 1822 to his death a similar series on natural philosophy. He discovered the process of artificial congelation, and invented the differential thermometer.

Lesseps (lâ-sêp'), Ferdinand de (Vicomte), 1805-94; French diplomat and engineer; b. Versailles; entered public life as consular *attaché* at Lisbon, 1828; later was vice consul at Alexandria; consul and consul general at Barcelona. He conceived the project of the Suez Canal, which was begun, 1859, and completed, 1869, under his superintendence. He also promoted the construction of the Corinth Canal, and, 1880, formed a company for the construction of the Panama Canal, work on which was begun, 1881. After \$280,000,000 had been expended, and but a trifling portion of the work had been done, the scheme collapsed, 1889, and the company was dissolved. The officials were prosecuted by the French Govt. on the charge of fraudulent dealing and bribery, especially of members of the Legislative Assembly, and a sentence of imprisonment was passed, but in the case of De Lesseps it was not carried out. He was given the Cross of the Legion of Honor, 1836, for noble con-

duct during the plague in Egypt; was later promoted officer and Grand Cross, without passing through the grade of grand officer; was also made a member of the Academy of Sciences, 1875, and of the French Academy, 1884. Author of "Memorial to the Academy of Sciences on the White Nile and the Sudan," "Principal Events in the History of Abyssinia," "Letters, Journal, and Documents for a History of the Isthmus of Suez," etc.

Les'sing, Gotthold Ephraim, 1729-81; German poet and dramatist; b. Camenz, Silesia; son of a clergyman; studied theology and medicine at Leipzig and took his degree at Wittenberg, 1753; resided in Berlin chiefly, 1748-60, having taken up literary work in earnest; was secretary to Gen. von Tauenzien at Breslau, 1760-65; official playwright and artistic director of the Hamburg Theater, 1767-70; librarian of the ducal library at Wolfenbüttel after 1770. His works include "Miss Sara Sampson," a tragedy, produced 1755; "Letters on Literature," 1759-65, with Moses Mendelssohn and the publisher Nicolai; "Minna von Barnhelm," 1767, the first national drama of Germany; "Laokoön, or the Limits of Poetry and Painting," 1766; "The Hamburg Dramaturgy," 1767-69, dramatic criticisms; "How the Ancients Depicted Death," 1769, an archaeological treatise; "Emilia Galotti," 1772, his best tragedy from a technical point of view; "Ernst and Falk, Dialogues for Freemasons," 1778; "Nathan the Wise," 1779, the most celebrated of his dramas; "The Education of the Human Race," 1780. While at Wolfenbüttel he published the famous "Wolfenbüttel Fragments," a number of treatises concerning the origin of Christianity by H. Samuel Reimarus, and thereby so aroused the wrath of the orthodox clergy that the rest of his life was more or less filled with unpleasant controversies.

Lessing, Karl Friedrich, 1808-80; German artist; b. Wartenberg, Silesia; received his first artistic instruction at the school of architecture at Berlin; studied then for several years at Düsseldorf under Schadow, and was appointed director of the gallery of paintings at Carlsruhe, 1858. His paintings are partly landscapes, partly historical, and among the latter his "Hussites," "Huss before the Council," "The Martyrdom of Huss," and others, excited great admiration by the strength and richness of their characterization.

Lestocq (lës-tök'), Jean Herman, 1692-1767; French adventurer; b. Celle, Hanover; son of a French emigrant; became a surgeon in the service of Peter the Great of Russia, and later in that of the Princess Elizabeth, over whose mind he acquired complete control and whom he instigated to undertake the revolution of 1741 which made her Empress of Russia. For several years his influence in Russian politics was very great, but, 1748, the suspicions of the empress were aroused and he was banished. In 1761 Peter III recalled him to the court.

Lesueur (lê-sü-êr'), Eustache, 1617-55; French painter; b. Paris; was long neglected, but his masterpiece, "St. Paul healing the

Sick by the Imposition of Hands," gained him the surname of the "French Raphael." His grace of touch and composition is conspicuous in his nineteen pictures in the *salon des musées* of the Hôtel Lambert, Paris, and still more in the twenty-two pictures representing the "Life and Death of St. Bruno."

Le Sueur, Jean François, 1760-1837; French composer; b. near Abbeville; was chapel master to Napoleon, 1804-14, and subsequently royal director of music; composed numerous operas, such as "Paul et Virginie" and "Télémaque," and many masses and oratorios, including a mass and Te Deum for the coronation of Napoleon, and wrote on the music adapted to sacred solemnities.

Leszcynski (lësh-chün'skë), Stanislaus. See STANISLAS LESZCZYŃSKI.

Lethe (lê'thê), in Greek mythology, (1) a daughter of Eris, and the personification of forgetfulness; (2) a river in the lower world, of which the departed souls drank before entering the Elysian Fields, thereby entirely forgetting all about their life on earth.

Let'o, or Lato'na, in Greek mythology, a Titan, the daughter of Cœus and Phœbe. She was the wife of Zeus before his marriage to Hera, and bore to the god of heaven Apollo and Artemis, both light gods. Hera, who hated Leto, pursued her over the whole earth, which, in compliance with an oath exacted by Hera, and in fear of the great god whom Leto was to bear, everywhere repulsed her. Finally the floating island of Delos, not being bound by the oath of Earth, offered Leto a place of refuge, on condition that her glorious son should never remove his worship from the island. She was always intimately associated with her children, in whose temples she was worshiped.

Letronne (lê-trôn'), Antoine Jean, 1787-1848; French archæologist; b. Paris; was appointed inspector general of the university, 1819, Prof. of History in the Collège de France, 1831, and of Archæology, 1838, and keeper of the archives of the kingdom, 1840. He refuted the assertions of Dupuis and others relative to the "zodiacs" discovered at Esné and Denderah, and showed that they were no older than the days of the Cæsars.

Let'ter of Cred'it, letter written by a merchant to his correspondent, in which the bearer is authorized to receive or to draw a certain sum of money in the manner stated in the letter. The party giving the letter of credit advises his correspondent by mail, furnishes him a duplicate, and describes the bearer, lest it fall into other hands; the signature of the person in whose favor the letter is drawn is also forwarded.

Letters of Jun'ius. See JUNIUS LETTERS.

Letters of Marque (märk). See MARQUE, LETTERS OF.

Letters, Pat'ent. See PATENTS.

Letters Rog'atory, writ or instrument issued in the name and by the authority of a judge

or court to another in a different country or state, requesting that the deposition of a witness be taken who is within the jurisdiction of the foreign tribunal, to be used as testimony in a cause pending before the judge or court from which the letters are sent.

Letters Testamen'tary, instrument in writing granted by a surrogate or other judicial officer having jurisdiction of the probate of wills to an executor as evidence of his authority, and empowering him to administer the estate of the deceased. When a person dies intestate, letters of a similar character, termed letters of administration, are granted to the person who is appointed administrator. See WILL.

Let'terwood, or Snake'wood, a rare and costly ornamental wood used for inlaying and veneering; the product of *Brosimum aubletii*; tree of S. America. Its rich brown wood has somewhat letter-shaped marks, which are nearly black.

Let'tic Race, subdivision of the Letto-Slavic or Slavo-Lettic group of the Aryan or Indo-European family, embracing the Lithuanians, Old Prussians, and Letts. The Lithuanian branch comprises the Lithuanians proper, who occupy the E. portion of the Russian governments of Kovno, Wilna, Courland, and Grodno, abt. 800,000; the Samogitians or Shamaities, who inhabit ancient Samogitia, now mainly included in the government of Kovno, abt. 500,000; and the Prussian Lithuanians, in the N.E. portion of E. Prussia, abt. 100,000. The Letts inhabit principally Courland, Vitebsk, and Kovno, and are estimated at abt. 1,000,000. Letivia, the portion lying between Esthonia (N) and Lithuania (S), formally separated from Russia, and in January, 1919, announced the constitution of an independent and sovereign Lettish state.

Lettres de Cachet (lêtr dé kä-shä'), in France, term applied under the old régime to letters or orders signed with the private seal of the king and used as instruments of despotic power. Before the seventeenth century they were not often employed, but under Louis XIV they became common. Many persons were arrested by such warrants and imprisoned without trial in the eighteenth century. The chief of police kept forms of *lettres de cachet* signed and needing only the insertion of the name of the person to be arrested; these were obtained by private persons to put troublesome relatives out of the way; abolished, 1790.

Let'tuce, important salad plant, *Lactuca sativa*; a composite herb, the native country of which is not known. There are many varieties, some of which form heads of leaves and others do not. It is easy of digestion, rather laxative, and gently soporific. From its juice the narcotic *Lactucarium* is prepared. About 120 varieties of lettuce are sold by seed dealers in the U. S. The so-called Cos Lettuces are noted for summer use, although they are much less popular in the U. S. than in Europe.

Leucæmia (lû-kê'mî-ä), or Leucocythæmia (lû-kô-sî-thê'mî-ä), blood disease, dependent on some disturbance in the process of blood mak-

ing. It receives its name from the character of the blood, which contains a remarkable increase in the number of white corpuscles or leucocytes. The disease is characterized by enlargement of the spleen and often of the lymphatic glands of the neck, axilla, or other regions.

Leu'cin, crystalline substance among the products of incipient putrefaction of the albuminoid or proteid bodies. It was discovered in cheese. It occurs diffused widely throughout living animal tissues. Its scientific name is *amidocaproic acid*. It was called by earlier investigators *oxide of caseine* or *caseous oxide*. Another crystalline substance, called *tyrosine*, always accompanies leucine in nature.

Leucocyte (lō'kō-sīt), collective name given to colorless migratory cells found in various parts of the body. They apparently arise in the lymphatic glands and other adenoid structures, and thence they find their way to all parts of the body. Their function seems to be largely that of eating foreign matters in the body, and they engulf bacteria, etc., after the manner of an amoeba.

Leucothe'a. See **INO**.

Leuc'tra, village of Boeotia, between Plataeæ and Thespiae; became famous as the place where the Thebans under Epaminondas defeated the Spartans under Cleombrotus, 371 B.C., thereby checking forever the influence which Sparta had exercised over Greece for several centuries.

Leutze (loit'séh), **Emanuel**, 1816-68; American painter; b. Gmünd, Württemberg; early emigrated to the U. S. with his parents; studied in Munich and Düsseldorf; opened a studio in New York, 1859. His works include the mural fresco, "Westward the Star of Empire Takes its Way," in the Capitol at Washington; "Columbus before the Council of Salamanca," "Washington Crossing the Delaware," "John Knox and Mary Stuart," "Cromwell and his Daughter."

Levant', **The** (Italian *levante*—rising), the countries bordering on the E. part of the Mediterranean—Asia Minor, Syria, and Egypt. The term was brought into use in the early Middle Ages, when the Italian republics controlled the commerce of Europe.

Levelers, name of an ultrademocratic political party in England, which was a strong element in the Parliamentary army during the Civil War, and, after the Parliamentarians triumphed, demanded the leveling of all ranks, the impartial administration of the law, and complete freedom of conscience in religious matters. In 1649 the Levelers broke out into actual mutiny, and were repressed with severity. John Lilburne was one of their leaders.

Level, an instrument for determining the difference in height between two points, or for ascertaining whether a surface is level. A level surface is one parallel with the surface of still water, and any line drawn in such a surface is a line of true level. A line of apparent level is a line contained in a plane tangent to a surface of true level. Levels are constructed on

one of three principles: (1) A line of apparent level is perpendicular to a plumb line freely suspended; (2) a line of apparent level is tangent to the free surface of a liquid in equilibrium, and (3) a ray of light which is perpendicular to a vertical mirror is a line of apparent level.

The level formerly much used by masons and bricklayers consists of a T-shaped frame, the line corresponding to the top of the T being perfectly straight and at right angles to a second line drawn through the middle of the stem of the T. A plumb line is attached at some point of the second line; and when the instrument is held so that the plumb line corresponds to this second line, the first line is a line of apparent level. The cross line of the T may be turned downward, as is usually the case when used by mechanics. This method applies the first principle.

The ordinary Y level is an example of the instruments constructed on the second principle. It consists essentially of a telescope mounted on two vertical supports, which from their shape are called Y's. The Y's themselves are attached to a solid bar, which turns about an axis at right angles to it. This bar and its axis are connected with a supporting tripod so arranged that the axis may be made vertical by the aid of leveling screws. Suspended from the telescope is a delicate spirit level, which, when in adjustment, is parallel to the line of collimation of the telescope. The line of collimation of the telescope is indicated by two cross hairs placed in the common focus of the field lens and eye piece. When the instrument is adjusted, the attached level is parallel to the line of collimation of the telescope, and both are perpendicular to the axis. To use the instrument the tripod is set firmly in the ground, and by means of the leveling screws the level bubble is brought in such a position that it will remain in the middle of the tube during an entire revolution around the axis. The axis of the limb is then vertical, and consequently the line of collimation of the telescope in all its positions is a line of apparent level.

Levels constructed on the third principle are called reflecting levels. One form of this class of levels consists of a plate of glass suspended from a ring, and weighted so that the plane of the glass shall always be vertical. One half of the glass is silvered and the other half unsilvered, the line of division between the two portions being vertical. A line is ruled across the middle of the plate perpendicular to the one last mentioned, and is consequently horizontal. To use the instrument it is held by the ring, and raised or lowered until the observer sees the image of his eye reflected from the ruled horizontal line on the silvered portion.

Leveling rods are graduated rods of wood having the 0 of the scale at the bottom of the rod. One of the best consists of a staff of hard wood, capped with metal, usually about 12 ft. in length. A sliding target can be moved up and down upon it. This rod is graduated to hundredths of a foot, and on one edge of the rectangular opening in the target is a vernier,

by means of which the rod may be read to thousandths of a foot. A second form of leveling rod is similar to that just described, except that the rod is constructed in two sections, one of which slides in a groove of the other. The arrangement of the graduation is modified to conform to the peculiar character of the sliding joint. A third form of rod consists of a simple rod without a target, the divisions and numbers being so distinct that the readings may be read by the observer at the level.

The difference of level between two neighboring points may be determined by means of the Y level and a leveling rod as follows: Let the level be set up at some convenient place, and so arranged as to indicate a surface of apparent level; place a leveling rod at the first point and note the height at which it is intersected by the level surface; in like manner place a rod at the second point and note the height at which it is cut by the level surface; subtract the first of these heights from the second, and the remainder will be the difference of level of the two points. If the remainder is +, the second point is higher than the first; if the remainder is -, the second point is lower than the first. In the same manner we may determine the difference of level between the second point and a third point, between the third point and a fourth, and so on.

Lev'er, a bar of metal, wood, or other substance turning on a support called the fulcrum or prop, and used to overcome a certain resistance (called the weight) encountered at one

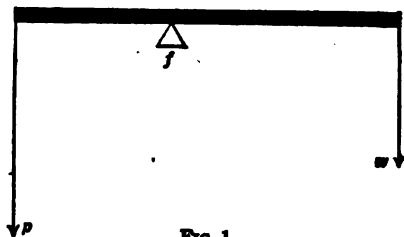


FIG. 1.

part of the bar by means of a force (called the power) applied at another part. Levers are of three kinds, viz.: (1) When the fulcrum is between the weight and the power, as in

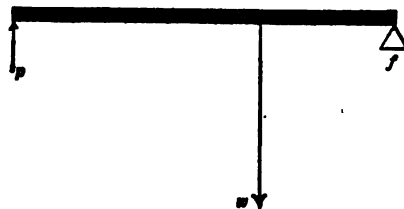


FIG. 2.

the handspike, crowbar, etc. In this case the parts of the lever on each side of the fulcrum are called the arms, and these arms may either be equal, as in the balance, or unequal, as in the steelyard. (2) When the weight is between the power and the fulcrum, as in

rowing a boat, where the fulcrum is the water. (3) When the power is between the weight and the fulcrum, as in raising a ladder from the ground by applying the hands to one of the lower rounds, the fulcrum in this case being the foot of the ladder. The law which holds in the lever is: The power multiplied

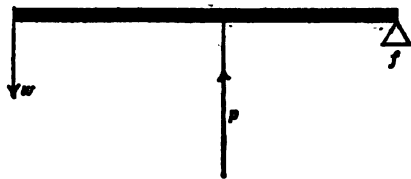


FIG. 3.

by its arm is equal to the weight multiplied by its arm. It is evident that when the power has a very large arm, and the weight a very small one, a very small power will overcome a great resistance. In the lever, as in all machines, when a small force overcomes a great one, the small force acts through a much greater distance than that through which the great force is overcome.

Lev'er, Charles James, 1806-72; Irish novelist; b. Dublin; was medical superintendent in Londonderry during the cholera season of 1832; physician to the legation at Brussels; editor of *The Dublin University Magazine*, 1842-45; vice consul at Spezia, 1858-67, and afterwards consul at Trieste; attained great success as a writer of humorous novels, chiefly descriptive of Irish life and character, among which are "Harry Lorrequer," "Charles O'Malley," "Arthur O'Leary," "The O'Donoghue," "Horace Templeton," "Con Cregan," "The Brambleighs of Bishop's Folly," "Lord Kilgobbin."

Leverett, Sir John, 1616-79; Colonial Governor of Massachusetts; b. England; settled in Boston, 1633, but returned to England, 1644, and took part in the struggle between the Parliament and the king. On his return to America he held important civil and military offices, and, 1673, was elected governor. His administration is important in colonial history as the era of the war with King Philip.

Leverrier (lè-và-rè-à'), Urbain Jean Joseph, 1811-77; French astronomer; b. St. Lo; began abt. 1836 the investigations in celestial mechanics that made him famous, and, 1843, he published an extended work on the orbit of Mercury. In 1845-46 he made his most notable discovery that the observed deviations in the motion of Uranus could be explained by the attraction of an unknown planet, and the planet Neptune was discovered by Galle at Berlin in September, 1846. This honor he shares with the English astronomer, John Couch Adams. In 1854 he succeeded Arago as director of the Observatory of Paris, an office which, except for an interval of three years, he held till his death; became a Senator, an Academician, and a grand officer of the Legion of Honor. As director of the observatory he investigated the orbits of the eight major plan-

ets in a series of researches, forming the greater part of volumes i to xiv of the "Annales de l'Observatoire de Paris—Mémoires."

Lever Wood. See **HORBEAN**.

Le'vi, in biblical history the third son of Jacob and Leah; b. Padan-aram; ancestor of one of the twelve tribes of Israel, called by his name. Of his personal history the only trait which has been recorded is the massacre which, with his brother Simeon, he perpetrated on the inhabitants of Shechem to avenge the wrong done his sister Dinah. Levi went into Egypt with his father and brothers after the elevation of Joseph, and died there. Moses and Aaron were his descendants, apparently in the fourth generation.

Levi'athan, name which in the Old Testament usually designates the crocodile, but Talmudical writers apply it to the whale, the fabulous dragon, and other creatures of monstrous size. The name is also used figuratively for gigantic animals as well as other objects.

Levirate Marriage, marriage of a widow by the brother of the deceased husband. This custom (common among the ancient Hebrews) was perpetuated by the Mosaic law (Deut. xxv, 5-10). It is, however, practically obsolete among the Jews. The canon law expressly forbids such marriage. In the U. S. it is generally permitted to marry the brother of a deceased husband. The true levirate marriage was compulsory, or at least obligatory (except on certain conditions), but only in case the deceased husband left no male issue. The first-born son of the new marriage succeeded to the deceased brother's name, property, and privileges. In Abyssinia and parts of Asia the levirate law is still in force. It seems to have prevailed in ancient Italy also.

Le'vite, one of the tribe of Levi; a descendant of Levi, but in a more limited sense one of those members of that tribe who did not belong to the priestly families of the ancient Hebrews. The Levites constituted a kind of inferior priesthood. They had no inheritance except certain cities on either side of the river Jordan, in which, however, they were not compelled to reside.

Lewald (lä'wält), **Fanny**, 1811-89; German novelist; b. Königsberg, Prussia, of Jewish parents, but became a convert to Christianity; married, 1855, the literary critic, Adolf Stahr; was a leader in the movement for the advancement of women. Among her writings are "Diogena," in which she burlesqued the sentimentalism of the Countess von Hahn-Hahn's books, "Von Geschlecht zu Geschlecht," "Stella," "Die Kammerjungfer."

Levit'icus (so named in the Vulgate because it is largely occupied with directions for the Levitical service), the third book of the Pentateuch and of the Old Testament. It contains the Mosaic law of sacrifices, the laws regarding ceremonial uncleanness, the laws with regard to intercourse between Israelites and foreigners, together with brief historical accounts, admonitions, and the like. Its direct Mosaic origin has usually been taken for

granted, but several recent German, Dutch, and English commentators refer it to the period of Ezra.

Lewes (lä'is), **George Henry**, 1817-78; English author; b. London; after studying philosophy and psychology in Germany, settled in London, 1840, and devoted himself to literature. His earliest important work was "Biographical History of Philosophy from Thales to Comte," 1847. His other works include a compendium of "Comte's Philosophy of the Sciences," "Life of Goethe," "Seaside Studies," "Physiology of Common Life," "Studies in Animal Life," "Aristotle, a Chapter from the History of Science," "Problems of Life and Mind." He was literary editor of the *London Leader*, 1849-54, and first editor of the *Fortnightly Review*, 1865-66. See **ELIOT**, **GEORGE**.

Lewis and Clarke Expedition. In 1803 Meriwether Lewis, with Capt. William Clarke, was put in command of an exploring expedition to cross the continent to the Pacific. They set out in the summer, and encamped for the winter on the Mississippi, opposite the mouth of the Missouri. In the spring of 1804 they began to ascend the Missouri. A second winter was passed among the Mandans, lat. 47° 21' N. In July, 1805, they attained the point in the Missouri where three nearly equal streams concur; these were named Jefferson, Madison, and Gallatin. They ascended the Jefferson to its source, and traveled through the mountains until September 22d, when they entered the plains of the W. slope. On November 15th they reached the mouth of the Columbia, having traveled more than 4,000 m. from the confluence of the Mississippi and Missouri. On March 23, 1806, they began to reascend the Columbia, crossed the mountains to the Missouri, on which they reembarked August 12th, and reached St. Louis, September 23d. Congress made Lewis Governor of Louisiana Territory, and Clarke general of its militia and Indian agent. The centennial of the exploration of the Oregon country was celebrated by an international exposition in Portland, Ore., 1905.

Lew'is Andrew, abt. 1730-80; American military officer; b. Ulster, Ireland; was taken, 1732, by his father to Bellefonte, Va.; was a volunteer in the campaign to the Ohio, 1754; a major in Braddock's expedition. He commanded the Sandy Creek expedition in 1756; was made prisoner by the French, 1758, near Fort Duquesne, and taken to Montreal; was the Virginian commissioner in the treaty with the Iroquois at Fort Stanwix, 1763; brigadier general, 1774, and commanded the Virginia troops in the victory over the Shawnee Confederacy at the mouth of the Great Kanawha River, October 10, 1774. He was for several years a member of the House of Burgesses; took part in the convention of 1775; appointed a brigadier general by Congress at Washington's request, 1776, and was engaged in military operations against Lord Dunmore.

Lewis, Francis, 1713-1803; signer of the Declaration of Independence; b. Llandaff,

Wales; became a merchant of New York, and in the French and Indian War was captured at Oswego and sent to France; received a grant of 5,000 acres from the British; was, 1775-79, a member of Congress, and was afterwards exceedingly useful to the country; importer of military stores.

Lewis, Sir George Cornewall, 1806-63; British statesman and author; b. Radnorshire, Wales; entered Parliament, 1847; was an Under Secretary of State, 1848; Secretary of the Treasury, 1850-52; Chancellor of the Exchequer, 1855-58; Secretary of State for the Home Department, 1859; for War, 1861; and was one of the translators of Müller's "History and Antiquities of the Doric Race"; author of "Origin of Romance Languages," "Influence of Authority in Matters of Opinion," "Methods of Observation and Reasoning in Politics," etc.

Lewis, John Travers, 1825-1901; Canadian prelate; b. Cork, Ireland; was curate of Newton Butler, 1847-49; missionary at Hawksbury, Ontario, 1849-54; rector of Brockville, 1854-61; then elected the first Bishop of Ontario. He became Metropolitan Bishop of Canada, January 25, 1893, and Archbishop of Ontario, September 19, 1893, being the first to hold that rank in the Church of England in Canada. Archbishop Lewis was the author and promoter of the Lambeth Conference of all bishops of the Church of England at home and abroad with those of the Protestant Episcopal Church of the U. S.

Lewis, Meriwether, 1774-1809; American explorer; b. Charlottesville, Va.; volunteered in the Whisky Insurrection of 1794; ensign in the regular army, 1795, and captain in 1800; was Jefferson's private secretary, and in 1803-6 he, with Capt. William Clarke, was sent upon a famous expedition to the Pacific Ocean. In 1807 Lewis was made Governor of Louisiana Territory. He was subject to depression of spirits, and took his own life. See **LEWIS AND CLARKE EXPEDITION**.

Lewis, Morgan, 1754-1844; American soldier; son of Francis Lewis; b. New York; served in the Revolutionary War, distinguishing himself at Saratoga, and in Gen. Clinton's operations against Sir John Johnson in N. New York; retired with the rank of colonel; became Attorney-general of the State, 1791, and Judge of the Supreme Court, 1792; was Chief Justice, 1801-4, and, 1804, was elected Governor. In 1812 he was appointed quartermaster general in the army; 1813, as major general, made a successful descent on the British side of the Niagara River, and, 1814, commanded the forces concentrated for the defense of New York City.

Lewis, clamp to raise blocks of stone. Three iron keys, suspended from a cross bolt, are let into a fish-tail-shaped hole in the stone. The three keys together fill this hole, and the stone can be lifted by means of the cross bolt. When the stone is in place the bolt is withdrawn; the middle key, which is straight, is slipped out, and the lateral wedge-shaped keys are then readily removed.

Lew'iston, city in Androscoggin Co., Me.; on the Androscoggin River; 34 m. N. of Portland; derives exceptional power for manufacturing from the river by means of a dam and a distributing canal constructed at a cost of \$1,000,000; is the seat of Bates College and Cobb Divinity School (Freewill Baptist); has manufactures of cotton and woolen goods, cotton mill machinery, leather belting, shoes, carriages, brick, and furniture; was founded 1770, incorporated 1795, and chartered as a city, 1861. Pop. (1910) 26,247.

Lew'is-with-Har'ria, largest of the Outer Hebrides, separated from the mainland by the Minch Channel; area, 770 sq. m. The coasts, especially of the S. part, Harris, are wild and rugged. Barley and potatoes are cultivated, but fishing is the principal occupation. The inhabitants speak the Gaelic language, though in the N. part there is a colony of purely Scandinavian descent. Stornoway, on the E. coast, is the only town on the island. Pop. (1901) 34,224.

Lex'icon. See **DICTIONARY**.

Lex'ington, capital of Fayette Co., Ky.; 80 m. S. of Cincinnati; is the commercial and financial center of the famous Bluegrass region, and the principal market for its three great products—blooded horses and cattle, hemp, and tobacco; manufactures whisky, tobacco, hemp, stoves, flour, building supplies, canned vegetables, saddlery, harness, carriages, and wagons; is the seat of Kentucky Univ. (Christ.), the State Agricultural and Mechanical College, Sayre Female Institute (Presb.), St. Catharine's Academy (R. C.), Hamilton College, Dudley, Morton, and Russell high schools, State Hospital for the Insane, State Reform School, Protestant Infirmary, Colored Industrial Home, St. Joseph's Hospital, and a noted racetrack; was settled 1775; incorporated by the Virginia Legislature, 1782; and the seat of the first Legislature of Kentucky. Pop. (1910) 35,099.

Lexington, village and town in Middlesex Co., Mass.; 11 m. NW. of Boston; principal business, farming, dairying, and market gardening. Memorable as the spot where the first blood was shed in the Revolutionary struggle, this town possesses many mementoes of that period. A modest granite monument on the village green tells its story of life sacrificed for principle, while a memorial hall contains tablets and statues of John Hancock and Samuel Adams; of the minuteman of 1775 and the soldier of 1861. Pop. (1910) 4,918. See **LEXINGTON, BATTLE OF**.

Lexington, capital of Lafayette Co., Mo.; on the Missouri River, 45 m. E. of Kansas City; is the center of the richest coal region in the state, also of the hemp-growing section; on a bluff 300 ft. above the river; has manufactures and a large river commerce; and contains Wentworth Military Academy (non-sect.), Lexington College for Young Women (Bapt.), and Central Female College (M. E. S.). In September, 1861, a Union force of about 3,000 men, under Col. James Mulligan, occu-

pied the hill on the NE. of Lexington, which naturally strong position was fortified and held against a Confederate force of some 18,000 men, under Gen. Sterling Price, the siege terminating on the 20th in the surrender of the town and garrison. On Frémont's approach with a large force Price withdrew, leaving a few men in the town to guard the wounded prisoners remaining there. On October 16th Maj. Frank J. White, with about 220 men, captured sixty or seventy prisoners and released such of Mulligan's force as were found there. Again in October, 1864, the army of Price here attacked Gen. Blunt, who, after a two hours' resistance, withdrew. Pop. (1910) 5,242.

Lexington, Bat'tle of, first armed encounter between the British and Americans in the Revolutionary contest, at Lexington, Mass. On the night of April 18, 1775, Paul Revere, of Boston, brought information of the intended march of a detachment of British troops to seize the provincial stores and cannon at Concord; and the militiamen, commanded by Capt. John Parker, were held in readiness. Just at daybreak the advanced guard of the enemy, commanded by Maj. Pitcairn, was discovered approaching the village. The alarm was given, and between sixty and seventy of the militia assembled on the common.

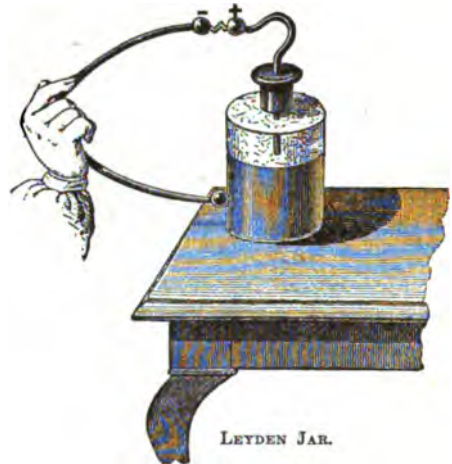
When within five or six rods of the Americans, Pitcairn ordered them to lay down their arms and disperse. They kept their ranks until he discharged his pistol against them and ordered his men to fire. A discharge of musketry followed, by which four were killed on the spot and nine wounded; four others were killed while attempting to escape. When the British fired, Capt. Parker ordered his men to disperse; a few of them returned the fire, wounding three British soldiers and the horse of Pitcairn. The British, after a halt of half an hour, marched on to Concord. On their retreat from that place, while passing through Lincoln, they were attacked by the Lexington men, and as they were ascending Fiske's Hill, in the W. part of Lexington, a sharp contest took place in which several were killed. About 1 m. below the common they were saved from total destruction by the arrival of a reinforcement of 1,200 men under Lord Percy.

Leyden (l'dén), John, 1775-1811; Scottish author; b. Denholm; 1802 was appointed assistant surgeon in the East India Company's service; 1806, Prof. of Hindustani in Fort William College, shortly afterwards Judge of the Twenty-four Pargunnas; and, 1810, assay master of the mint; works: "Historical Account of Discoveries and Travels in Africa" and "An Essay on the Languages and Literature of the Indo-Chinese Nations," published in the "Asiatic Researches."

Leyden, Lucas van (also called LUCAS DAMMESZ), 1494-1533; Dutch painter; b. Leyden; at fourteen years of age engraved the celebrated print of "Mohammed Killing Sergius"; painted in oil, distemper, and on glass; most important work, the "Last Judgment," in the Townhall at Leyden; was equally celebrated as an engraver.

Leyden, or Lei'den, city of S. Holland; on the Old Rhine; 31 m. W. of Utrecht; is well built; has broad, well-kept streets, and is intersected by numerous canals, bordered by avenues of trees. It is chiefly interesting for its famous university, founded, 1575, by William of Orange as a reward to the citizens for their heroic defense against the Spaniards the previous year. In the sixteenth century Leyden was the center of the woolen-fabric industry, and had a population of 100,000. Pop. (1905) 56,044.

Leyden Jar, a well-known form of electrostatic condenser, so named from its invention in the town of Leyden (1745) by Cuneus. It consists of a wide-mouthed glass jar, of some variety of glass which insulates well. Inside and out it is covered nearly to the neck with tinfoil. A brass knob inserted in the wooden cover is connected with the inner coating by means of a wire or chain. When a difference of potential is produced between the coatings of a Leyden jar, it becomes charged, the energy of charge depending, as in any condenser,



upon surface of the coatings, their distance apart, and specific inductive capacity of the intervening glass. The length of spark, upon discharge, rises with the potential difference between the coatings, but not in direct proportion to the same, excepting when the spark occurs in certain liquid dielectrics. Leyden jars are frequently connected in series (the cascade arrangement) to secure a potential difference equal to the sum of those due to the electrification of the individual jars, or in multiple, all outside coatings connected together and inner coatings the same, when increased quantity is desired. Such a combination, in either form, constitutes a Leyden battery.

Léys (lîs), Jean Auguste Henri (Baron), 1815-69; Belgian painter; b. Antwerp. In 1833 his "Combat of a Grenadier and a Cossack" attracted much attention, and, 1849, he became one of the directors of the Academy of Fine Arts there. To the Paris Exhibition of 1855 he sent "The New Year in Flanders" and other pictures, for which one of the great gold

medals was awarded him. From this time he devoted himself entirely to historical painting. In 1865 he was made a baron.

Leyte (lā's-tā), Philippine island in the Visaya group, having Samar, Dinagat, and Mindanao on the SE., Bohol on the SW., Cebu on the W., and Masbate on the NW.; area, mainland, 3,872 sq. m., with forty dependent islands, 4,214 sq. m.; pop. (1903) 357,841; constitutes a province; capital, Tacloban. The irregular coast line is indented by some of the finest bays in the archipelago; interior is mountainous, with a number of extinct volcanoes, many fine rivers, and numerous good roads and trails; island is one of the best cultivated in the archipelago; most important product, hemp; others, sugar, rice, coffee, cotton, corn, cattle, swine, wax, honey, sponges, and pearls; mineral products, sulphur, gold, iron, lead, silver; indications of petroleum. Tacloban has large shipyards; other industries, manufactures of hemp goods and extraction of coconut oil.

Lhasa (lha'sā). See **LASSA**.

Lhermitte (lār-mēt'), **Léon Augustin**, 1844-; French genre painter; b. Mont-Saint-Père, Aisne; received a second-class medal in the Salon of 1880; decoration of the Legion of Honor in 1884; medal of honor at the Paris Exposition of 1889; pictures are notable for vigor and technical qualities of a high order; "Harvesters' Wages" is in the Luxembourg Gallery, Paris; "The Vintage" in the Metropolitan Museum, New York.

L'Hôpital (lô-pô-tāl'), **Michel de**, 1504-73; French statesman; b. Aigueperse; studied law; entered on judicial functions in the Parliament of Paris, 1537; was sent to the Council of Trent, then just removed to Bologna, 1547; became member of the Council of State, 1553; and president of the Court of Accounts, 1554; succeeded Olivier as Chancellor of France, 1560. He opposed the introduction of the Inquisition into France; at meeting of the States-General at St.-Germain, just before the outbreak of the Huguenot wars, asserted principles of toleration and civil liberty far in advance of the spirit of the age; escaped the massacre of St. Bartholomew's night.

Liakhov (lā'ā-khōv) **Islands**, two islands of New Siberia; in the Arctic Ocean, off the mouth of the Yana. The larger, Blizhniy Liakhov, is 70 m. in length and 40 m. in breadth; the smaller, Maly Liakhov, is 30 m. in length and 15 m. in breadth. They are not permanently inhabited, and are especially remarkable for the large number of bones of mammoths and other extinct animals.

Liaoyang (lyow-yāng'), city in province of Shen-king, Manchuria; on railway between Port Arthur and Mukden; is a walled city, with large market gardens, first-class stores, and considerable general trade; scene of a great defeat of the Russians by the Japanese, September, 1904. Pop. (1900) 80,000.

Li'as, English provincial name for a group of strata lying at the base of the Jurassic formation, and more or less intermingled with

the overlying oolite; but in the Jura the two formations are distinct, the oolite reposing unconformably upon the lias. Over a considerable portion of Europe it is found in alternating beds of clay, sandstones, and limestones, which altogether attain a thickness of 500 to 1,000 ft.

Libanius, 314-392; Greek rhetorician; b. Antioch; taught rhetoric at Constantinople (whence on account of his great popularity his rivals procured his expulsion as a sorcerer), Nicomedia, and Antioch; was a pagan, but maintained friendly relations with many Christians, and St. Basil and St. Chrysostom were his pupils. Many of his compositions are extant.

Libation, among the Romans, a drink offering sacrificed to the gods or to the spirits of the dead, by pouring a portion of the draught on the altar or the ground, either as a separate act of worship or in connection with other sacrificial rites. The libation was most commonly of wine, unmixed with water; but it might also consist of honey or milk, as the occasion or ritual demanded.

Libau (lā'bow), town in government of Courland, Russia; on the Baltic; 146 m. W. by S. of Riga; has a considerable shipbuilding interest, large trade in timber and corn, extensive charitable institutions, and a naval and commercial harbor that cost \$12,500,000. Its harbor freezes later than other harbors of the Baltic, and is earlier free of ice. It was nearly destroyed by fire, 1896, and was occupied by the Germans May 8, 1915. Pop. (1908) 64,502.

Libby Prison, Confederate prison in Richmond, Va., used before the Civil War as a tobacco warehouse. At times during the war it held as many as 1,200 Federal prisoners, mostly officers, and on account of overcrowding and unsanitary conditions the prisoners suffered terribly. Several attempts at escape were made, especially on February 9, 1864, when the prisoners dug a tunnel 50 ft. long under the wall, and through this 100 got away; more than half of whom joined the Federal lines; the others were recaptured. In 1888 the building was torn down, carried to Chicago, and there reerected, brick by brick, and used as a war museum.

Libel and Slander, in law, those utterances which produce a legal injury to the reputation of another. If the defamatory utterance consists in speech, either vocal or manual (as in the case of mutes), it is called slander. If made by means of permanent visible signs, employed to convey distinct ideas, as by writing, printing, painting, or effigy, it is termed libel. By the Roman law a person could be defamed by another's acts, unaccompanied by defamatory words or signs, as when with a view to injure his credit his goods were seized by the other on a fictitious debt. In such cases the English law gives the injured party an action for damages, but does not treat the wrong as defamation. Nor does the English law deal with every assault upon a person's reputation or honor by word or sign as an actionable defamation, even though it is made

maliciously and causes harm to its victim. In order that it amount to actionable defamation it must produce legal injury to the reputation of the one assailed.

Libelt (lî'bêlt), Karól, 1807-77; Polish author; b. Posen; served as an artilleryist in the Polish War of 1831; was afterwards active as a literary editor in Posen; was imprisoned in Berlin on a charge of treason, 1846-48; was subsequently a member of the national committee in Posen, of the Slav Congress at Prague, of the Frankfort Parliament, and of the Prussian House of Delegates; published in Polish and German works on mathematics, philosophy, aesthetics, and rural economy.

Lib'eral, one who holds progressive views in politics or religion, especially a member of that political party in Great Britain which, in opposition to the Conservatives, has sought to promote reform.

Liberal-Unionists, members of a political party in Great Britain, formed in 1886 by separation from the Liberal party in consequence of the latter's support of Home Rule. Under the leadership of the Marquis of Hartington, afterwards the Duke of Devonshire, and Mr. Joseph Chamberlain, one of the members for Birmingham, they allied themselves with the Conservatives on the Irish question in that year, and secured the defeat of Mr. Gladstone. With the aid of this alliance the Conservatives remained in power till 1892, when in the general election the Liberals, with the help of the Irish members who favored Home Rule, secured votes enough in the House of Commons to defeat the Conservatives and Liberal-Unionists by a majority of 34.

Libe'ria, republic on the W. coast of Africa, stretching from the San Pedro River, on the SE., to the Gallinas River, on the NW., a distance of 800 or 700 m.; est. area, 40,000 sq. m.; est. pop., between 1,500,000 and 2,120,000, all pagan and Mohammedan aborigines, excepting about 20,000 American colonists and their descendants. The chief towns are Monrovia (capital), Cape Mount, Grand Bassa, River-Cass, Sino, Cape Palmas, Robertsport, Royesville, Careysburg, Millsburg, Boparo, and Rocktown. The Americo-Liberians are Anglicans, Presbyterians, Baptists, and Methodists. There are several American missions and a French Roman Catholic; elementary schools are numerous, secondary ones are increasing, and there is a college in Monrovia. The republic is rich in natural resources, but their exploitation is hindered in some cases and prevented in others by laws which prohibit any but Liberian subjects from holding land and forbid foreigners to trade anywhere except at the ports of entry. The chief products are palm oil, coffee, rubber, and ivory, with some poorly cultivated cotton. Imports (1908) amounted to \$966,000; exports, \$384,000.

The country is divided into four counties—Montserrado, Grand Bassa, Sino, and Maryland. The constitution is modeled after that of the U. S. All men are born free and equal before the law. Elections are by ballot, and every male citizen possessing real estate

has the right of suffrage. The President is elected for two years; Senators for four; Representatives for two. Each county sends two Senators to the Legislative Assembly, and one Representative for every 10,000 inhabitants.

Liberia was founded by the American Colonization Society, organized 1811 at Princeton, N. J., with the object of settling in Africa freedmen and recaptured slaves. In 1817 agents were sent out to select a site, and chose Sherbro Island and the adjacent coast, and, 1820, a colony of eighty-eight persons emigrated, intending to erect huts for the reception of several hundred slaves and to cultivate land for their own support. In 1822 they abandoned their settlement on Sherbro Island and made a new one at Cape Montserrado. In 1824 the society adopted a plan for the civil government of Liberia, but retained the ultimate decision on all questions of government. In 1828 a more formal constitution was adopted, giving the colonists greater power in civil matters. To avoid threatened trouble with Great Britain, which claimed that Liberia had no existence as a nation, and could not levy imports on the goods of British traders, the directors of the society surrendered their powers and advised the colony to declare itself an independent nation. This was done July 26, 1847. In 1857 Maryland, a negro republic to the E. of Cape Palmas, founded as a colony, 1821, by philanthropists of the State of Maryland, united with Liberia.

Libe'rius, abt. 300-366; saint and pope of the Roman Catholic Church; was a deacon of the Roman Church, and elected pope, 352. The papal legate and other prelates having been maltreated for refusing, at the Council of Arles, 353, to subscribe an imperial edict condemning Athanasius, Liberius sent a letter of indignant reproof to Emperor Constantius, and demanded that another council should be called at Milan, 355. At this the emperor threatened with instant death all who would not comply with his will, and the pope's legate, Hilarius, was publicly scourged. Liberius immediately protested, and was arrested, carried away by night, and taken to Milan; was given three days to deliberate, but remained firm, and was exiled to Berea in Thrace. Constantius, bent solely on making his theological creed prevail, entered Rome, 357. In 358 Liberius was restored to his see.

Lib'erty, the power of acting as you will. It is assumed that the will itself is free, in view of motives, to choose what appears to be the greater good before the less, or the less before the greater. Liberty in the sphere of the citizen cannot be understood without a correct idea of rights. It may exist merely in a degree, as with children, who have rights even against their parents, but are wisely disqualified from the rights of contract and of testament so as to prevent them from injuring themselves. Political liberty implies a share in political power, as shown by the right of voting, of holding office, of freedom of the press, etc. Personal liberty and equality of individual rights may exist without equality of political rights. Thus a man who cannot

read, or does not hold a certain amount of property or pay a certain house rent, may have no right to suffrage or eligibility to office. So a woman may have no suffrage, a man over seventy may be ineligible to hold a judicial office, or a man under thirty-five be ineligible to the office of President of the U. S.

Liberty Bell, famous bell, originally imported from England, 1753. It was cracked at the first ringing after its arrival, and recast in Philadelphia in the same year. On the fillets around it were cast (twenty-three years before the Declaration of Independence) the prophetic



LIBERTY BELL.

words, "Proclaim liberty throughout all the land unto all the inhabitants thereof." The bell, broken for many years, is to be seen in the hallway of the old State House, Philadelphia.

Liberty Loans, official designation of four series of popular subscriptions for bonds to aid the U. S. in carrying on its share of the World War. A fifth series was designated "Victory Loans." The several campaigns were conducted between May 14, 1917, and May 10, 1919, and resulted as follows: First loan: amount asked by the government, \$2,000,000,000, amount subscribed, \$3,035,220,850; subscribers, 4,500,000. Second loan: amount asked, \$3,000,000,000; subscribed, \$4,617,532,300, subscribers, 9,500,000. Third loan: amount asked, \$3,000,000,000; subscribed, \$4,176,516,850; subscribers, 18,000,000. Fourth loan: amount asked, \$6,000,000,000; subscribed, \$6,993,073,250; subscribers, 21,000,000. Victory loan: amount asked, \$4,500,000,000; subscribed, \$5,249,908,300; subscribers, 12,000,000.

Liberty, Religious, absolute freedom of religious opinion and worship, the equality before the law of all churches, religious associations, or persons, in the way of protection or restraint. Until the third century Christianity had the hostility of governments. After the Reformation, Protestant kings and governments assumed the authority over religion formerly exercised by the popes. A national church in each country became the

subject of state favors and privileges. Citizenship and church membership were coextensive, and to crush dissent, lives were sometimes taken, property was confiscated, and various disabilities imposed. It was not until the nineteenth century that the civil disabilities of the Jews in England were removed, and a particular religious belief is still required there for the tenure of the throne, and certain high offices in the state and the universities.

In the U. S. there is entire divorce of church and state. The Constitution of the U. S. declares: "No religious test shall ever be required as a qualification to any office or public trust under the U. S.," and "Congress shall make no law respecting the establishment of religion, or prohibiting the free exercise thereof." The state constitutions are even more specific. The Roman Catholic colony of Maryland as early as 1649 passed a formal act granting liberty of conscience to all accepting the cardinal doctrines of Christianity, as no interpretation of the charter could be made, "whereby God's holy rights and the true Christian religion, or the allegiance due to the King of England, may in any wise suffer by change, prejudice, or diminution." Religious tolerance did not originate in this colony with this act, but existed at least fifteen years earlier; in fact, it was secured in the charter itself of the colony, obtained in 1632, earlier even than in Rhode Island, which long was credited with the honor of being the first state in the world to incorporate in its organic law, and to practice, absolute religious liberty. In New England a kind of theocratic government was established. In S. Carolina, New York, and Virginia the Episcopal Church was established. Very early there was resistance to the attempt to perpetuate the English Church in the colonies, and the attempt hastened the beginning and aided in the success of the American Revolution.

Libocedrus, genus of coniferous trees, of which a few species are known; two grow in New Zealand, one in Chile, and one (*Libocedrus decurrens*) in California, where it was discovered by Frémont, and is now known as white cedar. The California species is found only in the mountains, generally at an elevation of 4,000 ft. or more; is a beautiful tree, attaining a height of 120 to 200 ft., with a trunk 6 or 7 ft. in diameter, and a peculiar fibrous bark, much like that of *Sequoia*.

Li'bra, sign of the zodiac which the sun enters at the autumnal equinox (about September 23d). The constellation Libra has no very remarkable stars. It corresponds at present to the sign Scorpio, while the sign Libra corresponds to the constellation Virgo. See AS; ZODIAC.



LIBRA.

Li'brary, collection of books designed for use and preservation; also the repository of such a collection. Libraries are probably nearly coeval with the art of writing. The oldest library of which we have any record is that of the Ramesseum, a temple in Thebes; but the most famous of all ancient libraries was that

founded by the Ptolemies in Alexandria. Next to the Alexandrian library, that founded by Eumenes-II, King of Pergamus, was the most celebrated of antiquity. Plutarch says it contained 200,000 volumes. It was given by Mark Antony to Cleopatra, and was merged in the Alexandrian. In Rome, Lucullus made a large collection, and Varro, Atticus, and Cicero were enthusiastic collectors of books. Augustus established the Octavian and Palatine public libraries, and Trajan the Ulpian. At a later period there were twenty-eight public libraries in Rome, besides many valuable private collections. All of these perished in the barbarian invasions. The library of Constantinople, founded by Constantine, and afterwards enlarged to the number of 120,000 volumes, was partially burned by the iconoclasts in the eighth century. Constantine Porphyrogenitus restored and enlarged it. After the fall of the Byzantine Empire it was preserved by the command of Mohammed II in the seraglio, and was either destroyed by Amurath IV or perished by neglect. The Mussulmans had an important library in Alexandria and another in Cairo. The latter is said by Arab writers to have numbered 1,600,000 volumes.

Other great Arabian libraries were at Bagdad, Tripoli in Syria, and Fez. Under Mussulman domination Spain possessed seventy public libraries; that at Cordova contained 400,000 volumes. In the West, after the fall of the Roman Empire, almost all libraries, up to the fourteenth century, belonged to ecclesiastical institutions. With the revival of learning began a new era in the history of libraries. Several of the largest of the European libraries date from this period, among them those of Prague, Paris, Vienna, the Vatican, and the Laurentian of Florence, founded by Lorenzo de' Medici. The invention of printing made possible the formation of many public libraries, which soon sprang up in all the considerable towns of Germany, Italy, and France; and in these and the several university libraries were gradually merged most of the small collections of the monasteries suppressed after the Reformation.

According to the report of the U. S. Commissioner of Education, 1900, the public libraries in the U. S., including in that designation every collection down to college, society, religious, and other libraries, numbering 1,000 volumes and upward, each, as well as the large libraries opened to public reference, numbered 5,383 collections, aggregating 44,591,851 volumes and 7,503,583 pamphlets. These statistics represented an increase of 1,357 in number and of 11,539,979 volumes, or 34.91 per cent over the similar statistics of 1896. Of these, 1,040 owned the buildings occupied, 592 rented, and 3,751 were unreported. The total income of 3,115 libraries reporting was \$7,812,406. In 1908, of all libraries, 6 had more than 500,000 volumes each; 9 had from 300,000 to 500,000; 141 upward of 50,000; and 740 having upward of 10,000, and 3,342 having between 1,000 and 5,000. The world's libraries of 1,000,000 and upward bound volumes each are the National Library of France, Paris; British Museum, London; Congressional Library, Washington, D. C.; Central Court Library, Munich;

Imperial Library, St. Petersburg, and the Royal Library, Berlin; and there are several in the U. S. and Europe that are rapidly approaching the 1,000,000 mark.

Library of Congress, institution in Washington, D. C.; established, 1800, for the use of members of Congress; has since become practically a national library; destroyed at the burning of the Capitol by the British, 1814, when it had only 3,000 volumes; revived, 1815, by the purchase of Jefferson's library of 6,700 volumes; greatly injured by fire, 1851, when only 20,000 volumes were saved; partially replenished, 1852, by a Congressional appropriation of \$75,000; and has since grown by regular appropriations by Congress, by the enactment of the Copyright Law of 1870, making it the sole office of record and receipt for every publication protected by copyright in the U. S., by the exchanges of the Smithsonian Institution, whose library was deposited here, 1866, by gifts, and by purchases of large collections, including those of Peter Force (22,629 volumes and 37,000 pamphlets), 1867; the Count de Rochambeau MS. collection, 1883; the Toner collection (24,484 volumes), and the Yudin collection of 80,000 volumes on Russia, 1906. The library is rich in history, political science, jurisprudence, national, state, and foreign official documents, and in *Americana*, including important files of American newspapers and original MSS. (colonial, revolutionary, and formative periods). In 1897 the collection, exclusive of the law library (94,600 volumes), was removed to a new building, which occupies nearly four acres, and was erected at a cost, exclusive of the land, of \$6,500,000. It is the largest and most commodious library building in the world, and in its interior decoration the most beautiful. The floor space is nearly eight acres, and the building could accommodate over 4,000,000 volumes. It has within its walls a printing plant, a branch of the Government Printing Office. The library is open to the public. One of its features is a reading room for the blind. In 1891 it contained nearly 700,000 volumes and 200,000 pamphlets; 1910, 1,793,168 volumes, 118,165 maps and charts, 320,251 art prints, and 517,806 pieces of music.

Libur'nia, in ancient geography, a mountainous district of Illyricum extending along the coast of the Adriatic in the present Croatia and Dalmatia. Driven by the unfriendliness of their mountains, the Liburnians turned their attention to commerce; their ships were seen in every sea, and became of great value to Rome after the submission of the Liburnians, 176 B.C.

Libya (lib'é-ä), name given by the Greeks to the whole continent of Africa, but after the Roman conquest the name Africa became universal, and the name Libya was generally applied only to that part which is now called the Libyan Desert, extending from Egypt to Fezzan and from the Mediterranean to Darfur, and consisting of vast stony terraces, sometimes covered with sand and gravel, and sometimes broken by oases, Seewah being the largest.

Lib'yans, nation which occupied in ancient times the whole N. coast of Africa with the exception of the delta of the Nile, though, according to Lepsius and other Egyptologists, they probably at one time occupied this territory, too, but were driven out by the Egyptians. They were a seafaring people, and harassed the Egyptians with continuous invasions, until their power was checked in the sixteenth century B.C. by Thothmes III. In the fourteenth century B.C., when the Pelasgians on the N. coasts of the Mediterranean had acquired some importance on the sea, the Libyans renewed their attacks on Egypt in connection with the Tyrrhenians and Achæans, and conquered lower Egypt, but were entirely defeated by **Rameses II.** At the period when the Phœnicians founded Carthage and the Greeks Cyrene, the Libyans became enfeebled. They were pressed back from the coast, and submitted completely to the Romans, and fell partly into barbarism.

Libyan Sea, in ancient geography, that part of the Mediterranean situated between the island of Crete, the delta of the Nile, and the territory of Carthage, or Africa proper, *Syrtis Major* and *Syrtis Minor* were inlets of this sea.

Licata (lê-kâ'tâ), or **Alica'ta**, seaport of Sicily, 26 m. SE. of Girgenti; is at the mouth of the Salso, and has a large trade in grain, fruits, wines, macaroni, soda, and sulphur; probably occupies the site of Phintias, built by the tyrant of that name abt. 280 B.C., to which he removed the inhabitants of Gela.

Lice, wingless insects which occur as parasites on the bodies of birds and mammals. Two distinct groups are recognized among the forms united under the common name lice: the one, the bird lice, forming a distinct order (*Mallophaga*), the others which occur on mammals

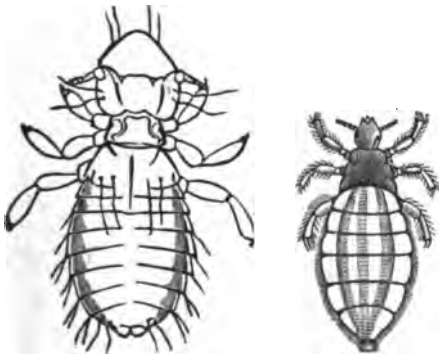


FIG. 1.—HEM-LOUSE.

FIG. 2.—BODY-LOUSE.

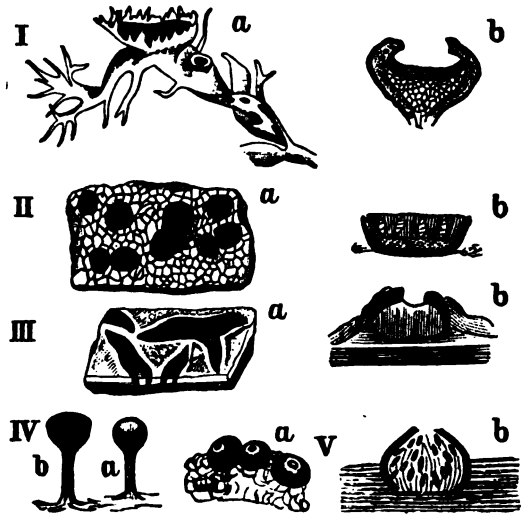
being included as a group, *Parasita* or *Pediculina*, among the *Hemiptera*, or true bugs. Man is subject to the attacks of three different species of lice: the head louse, the body louse, and the crab louse. Other mammals have their own parasites. The best remedy for these pests is cleanliness.

Li'cense to Trade, in international law, a permission given by a belligerent government

through its agent, such as a commander of a squadron, to trade with the enemy. It may be given to a neutral trader or to a fellow subject, and it generally specifies the kind of articles to be conveyed to the enemy, the port, the time, perhaps the amount. Being a permission to do something otherwise forbidden, it is of strict interpretation, so that to go beyond its specifications would subject the vessel and cargo to heavy penalties, unless the violation could be shown to be unavoidable.

Licen'tius, Christian poet of the beginning of the fifth century; native of Tagaste, N. Africa; pupil of Augustine, to whom he addressed a poem in 154 hexameters, still extant.

Lichen (lî'kên), cryptogamous plant belonging to the thallogens. The vegetative portion is the *Thallus*, which may be regarded as the plant proper, as it performs all the functions of root, stem, and leaves; it is exceedingly



FAMILIES OF LICHENS.

I, *Parmeliaceae*; II, *Lecidiaceae*; III, *Graphidaceae*; IV, *Caliciaceae*; V, *Verrucariaceae* (a, apothecia; b, sections of same)

variable in form, texture, and color. When the thallus forms a flat expansion it is called foliaceous, as in *Stictia*; if erect and cylindrical, as in *Cladonia*, it is fruticulose; in some it forms a mere crust on the soil or other surface, when it is called crustaceous; and when concealed beneath the fibers of the bark of trees, it is hypophleous. Whatever the form of the thallus, it consists wholly of cellular tissue, and its surface is destitute of stomata. The structure of the thallus is not homogeneous, but the microscope shows several distinct layers. The organs of fructification, called *Apothecia*, are sometimes concealed within the tissues of the thallus, but are commonly on its surface or margin, where they appear as variously shaped disks; sometimes, as in what are called "written" lichens, as *Graphis*, for example, the apothecia are elongated or

branching irregular spots, which have been compared to Japanese letters; similar lichens of related genera are quite common on the bark of oak and other forest trees. Apothecia are rarely of the same color as the thallus, and are black, brown, yellow, or red of various shades.

Lichens play an important part in the economy of nature, and it is probable that they were the first forms of vegetation on the dry rocks. They grow on almost every substance where alternate dryness and moisture can be found, a very few only passing much of their existence in a submerged state. Destitute of roots and dependent on the atmosphere for their nutrition, it seems to matter little with them on what matrix they fix. Many lichens have important uses as articles of food and of medicine, and in the arts. See **MOSESSES**.

Lichenin (lĭ-kĕn-in), or **Moss Starch**, substance contained in lichens, constituting in some cases, as in that of the so-called Iceland moss, reindeer moss, tripe-de-roche, etc., nearly the whole mass. Many other lichens contain similar gummy bodies.

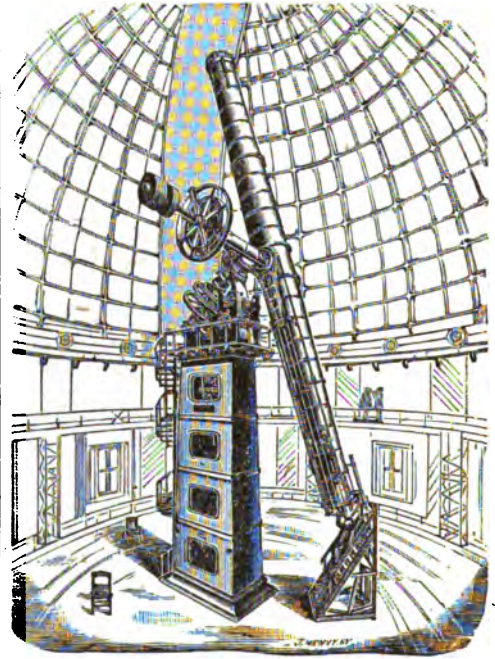
Lich'field, city of Staffordshire, England; 118 m. NW. of London, on an affluent of the Trent; has carpet manufactories, etc., a fine cathedral, and a grammar school, in which Addison, Johnson, and Garrick were educated. The cathedral, a noble pile, dates from the beginning of the thirteenth century, and is built in a transition style from early English to decorated; total length from E. to W., 411 ft., with a breadth of 66 ft., and it has an imposing central tower, 258 ft. high, with two W. spires 183 ft. high. Pop. (1901) 7,902.

Licinian (lĭ-sĭn'ĭ-ān) **Laws**, certain Roman laws enacted or proposed at different times by different persons named Licinius. The most important are those passed 367 B.C., permitting plebeians to share the consular dignity with patricians, prohibiting the owning by a single individual of more than 500 acres of land, or of keeping more than 100 cattle and 500 sheep, and providing that interest already paid on debts should be deducted and the balance paid in equal installments within three years.

Lick, James, 1796-1876; American philanthropist; b. Fredericksburg, Penn.; engaged in commercial pursuits in S. America, 1821-47; then went to California and made a large fortune by speculations, chiefly in real estate. In 1874 he assigned real and personal property, valued at about \$3,000,000, to trustees for public and philanthropic purposes; twice revoked this gift; and finally made the following provisions: For the construction of an observatory and the erection therein of a telescope more powerful than any before made, \$700,000, the same to be connected with the Univ. of California; for the erection of free public baths in San Francisco, \$150,000; for a monument to Francis Scott Key, author of "The Star-spangled Banner," in Golden Gate Park, San Francisco, \$60,000; for the erection in front of the City Hall of San Francisco of a group of bronze statuary representing the history of California, \$100,000; to found and endow the

California School of Mechanical Arts, \$540,000; and to found an old ladies' home in San Francisco, \$100,000.

Lick Observatory, astronomical department of the Univ. of California; on the summit of Mt. Hamilton, 4,209 ft. above sea level, and 50 m. S. of San Francisco; erected under a deed of trust executed by James Lick; occupies a site of 2,600 acres; contains a refractor telescope of 36 in. clear aperture and 694 in. focal length, a 12-in. and a 6-in. refractor, a 4-in. comet-seeker, a 6-in. meridian circle, a 5-in. photographic telescope, a 4-in. transit, a 5-in.



LICK OBSERVATORY 36-INCH TELESCOPE.

photoheliograph, etc., and the Crossley or Bersmerside reflector, presented to the Univ. of California by Edward Crossley, F.R.A.S., of England. The cost of the visual objective was \$50,000, of the photographic corrector about \$13,000, mounting of the telescope about \$45,000. The cost of the dome complete was about \$85,000, of the whole observatory about \$600,000.

The great steel dome is 75 ft. in diameter and weighs 100 tons. The floor of the dome is movable vertically (about 16½ feet), insuring a convenient position for the observer, whether the telescope is pointing horizontally or vertically. The base of the pier sustaining the great telescope contains, in a vault within its foundations, the remains of James Lick, placed there 1887.

Licorice (lĭk'ō-rĭs), perennial leguminous plant of the genus *Glycyrrhiza*. The roots of *G. glabra* and *G. echinata* yield the licorice of commerce, which is either the dried roots or a black mass rolled into balls or sticks obtained

by evaporating an infusion of the roots in water. That obtained from the former is



LICORICE PLANT. (*Glycyrrhiza glabra*.)

known as Spanish licorice and that from the latter as Italian licorice. Licorice is used as a flavoring, and in medicine as a demulcent.

Lic'tors, attendants of the Roman magistrates possessing imperium, before whom they bore the *fascēs* (axes and rods), the emblem of magisterial authority. They varied in number, according to the dignity of the officer whom they attended, from two for the prætor, within the city, to twenty-four for the dictator. They marched in single file before the magistrate whom they accompanied, and it was their duty to clear the way for him, to see that appropriate recognition was made of his dignity, and to execute his orders.

Lid'dell, Henry George, 1811-98; English classical scholar; b. England; head master of Westminster School, 1846-55; chaplain extraordinary to the queen, 1862; became dean of Christ Church, 1855; vice chancellor, 1870-74; translated (with Dean Scott) Passow's "Greek Lexicon"; wrote "History of Rome from the Earliest Times to the Establishment of the Empire."

Lid'don, Henry Parry, 1829-90; English pulpit orator; b. N. Stoneham; was vice principal of the Theological College, Cuddesdon, 1854-59; vice principal of St. Edmund's Hall, Oxford, 1859-70; Ireland Prof. of Exegesis there, 1870-82; prebendary of Salisbury, 1864-70; canon of St. Paul's, London, 1870-86; chancellor from 1886 till his death. Besides numerous volumes of sermons and minor works, he published the Bampton lectures on "The Divinity of Our Lord and Saviour Jesus Christ."

Lieber (lê'bér), or Lieb'ler. See **ERASTUS, THOMAS**.

Lieber, Francis, 1800-72; American publicist; b. Berlin, Prussia; served under Blücher, 1815; was wounded in the battle of Namur;

fought at Ligny and Waterloo; studied at Jena; was persecuted as a Liberal; went to Greece, Italy, and England; and settled in the U. S., 1827; lectured on history and politics; edited the "Encyclopedia Americana," 1829-33; became Prof. of Political Economy in S. Carolina College, 1835, and in Columbia College, New York, 1857, and subsequently of Political Science in the law school of the same institution. In 1865 he was appointed superintendent of a bureau at Washington for the preservation of the records of the Confederate Govt., and, 1870, he was chosen as final arbitrator in important cases pending between the U. S. and Mexico. He wrote numerous works on public questions.

Liebig (lê'bikh), **Justus von** (Baron), 1803-73; German chemist; b. Darmstadt; became professor in the Univ. of Giessen, 1826, and soon established a laboratory for teaching practical chemistry, the first of the kind in Germany. In 1832 Liebig, with Geiger, of Heidelberg, established the *Annalen der Pharmacie*, to which he largely contributed. In 1840 he published "Chemistry in Its Application to Agriculture and Physiology." This was soon followed by "Familiar Letters on Chemistry and Its Relations to Commerce, Physiology, and Agriculture," and by "Animal Chemistry, or Chemistry in Its Application to Physiology and Pathology." Several of his papers in the *Annalen* and other periodicals were embodied in "Researches on the Chemistry of Food" and "The Motions of the Juices in the Animal Body." With Poggen-dorff Liebig compiled the "Handbook of Chemistry" (9 vols., 1837-64), and he contributed to Geiger's "Handbook of Pharmacy," 1839, the portion devoted to organic chemistry, which afterwards appeared as a separate work. In 1855 appeared his "First Principles in Agricultural Chemistry"; 1856, "Theory and Practice of Agriculture"; 1859, "Letters on Modern Farming." Liebig remained at Giessen till 1852, when he became Prof. of Chemistry at Munich and president of the chemical laboratory. In 1860 he was appointed president of the Academy of Sciences of Munich. In science he ranks as one of the founders of organic chemistry, and his researches concerning the application of chemistry to physiology and pathology are invaluable.

Liechtenstein (lêkh'tên-stîn), independent principality, which until 1866 formed part of the Germanic confederation; bounded by Vorarlberg, Austria, and by the Swiss cantons of Grisons and St. Gall, from the latter of which it is separated by the Rhine; area, 65 sq. m.; pop. (1906) 9,850. Capital, Vaduz. The Prince of Liechtenstein belongs to the family of Este; his estates in Austria, Prussia, and Saxony, covering nearly 2,200 sq. m., with a population of more than 600,000, rendering him one of the richest proprietors in Germany. The family was raised to the rank of sovereign princes in the seventeenth century.

Liege (lê-âzh'), city of Belgium; capital of the province of Liege, and the center of one of the most enterprising and prosperous manufacturing regions of the country; in a valley

on both sides of the Meuse, at its junction with the Ourthe, and defended by a strong citadel on the summit of Sainte-Walburge, to the NW., and by several detached forts—Cornillon to the N., and Chartrouse to the E. The most remarkable of the public buildings are the cathedral, built in the thirteenth century; the Church of St. Martin, burned 1312, rebuilt 1542; the Church of St. Jacques, one of the richest specimens of the ogival Gothic; the Palais de Justice, built in Renaissance style, 1508-26, and formerly used as a residence by the prince bishop. The university, founded 1817, is a flourishing institution, and has a mining school, a polytechnic school, and a botanical garden connected with it. The whole region around Liege is very rich in coal and iron; the mines are run even under the city and the river. The products are very varied—cotton goods, cloths, straw hats, chemicals, etc.—but iron, especially as guns, cannon, and machinery, is the principal branch of manufactures. In 1815, the city was assigned to Holland by the Congress of Vienna, but, 1830, it was one of the first places which rose for the independence of Belgium. When in 1914, the Germans violated the sovereignty of Belgium and invaded its territory for a speedy passage into France, Liege was the first Belgian city occupied by the invaders (Aug. 9). Pop. (1912) 170,639.

Liegnitz (lĕg'nĭts), town in province of Silesia, Prussia; at the confluence of the Katzbach and the Schwartzwasser; 38 m. W. by N. of Breslau; is a neat and thriving town, with many good educational institutions and large manufactures of cloth, leather, and tobacco. It was formerly a fortress, but its fortifications have been transformed into gardens and promenades. In the twelfth century it became the seat of the Dukes of Liegnitz, and in its vicinity was fought the battle of Wahlstatt (1241), which, though a victory for the Mongols, checked their invasion. At times it was a center of conflict in the Thirty Years' War, and the Saxon army defeated the imperialist forces in the neighborhood in 1634, but the historical events for which it is chiefly noted are the battle of August 15, 1760, in which Frederick II defeated the Austrians, and that of August 26, 1813, in which Blücher defeated the French (battle of the Katzbach). Pop. (1905) 59,706.

Lien (lĕn), French "bond," legal term used in various senses. Properly a lien is merely a right to retain possession of a chattel until some debt or demand, generally incurred in respect of it, is paid by the owner. Or it may be a charge upon lands or chattels, not held by the creditor, but enforceable at law by the sale of the thing and the payment of the demand from the proceeds. The essence of a *common-law* lien is the possession of the thing over which it extends, and usually arises where goods are received in order that some service in respect of them may be rendered. The more usual instances are of warehousemen, innkeepers on the goods of their guests, common carriers, those who labor upon goods either in the way of construction or repair (as tailors and mechanics), bankers who have a

lien upon securities for advances made thereon, and lawyers who have a lien upon the papers of their clients and upon judgments obtained by them.

Possession is not essential to create an *equitable lien*. Thus whenever land is sold, but the price remains unpaid and unsecured, the vendor has an equitable lien on the land for the unpaid price. *Maritime* or *admiralty* liens are enforceable against a vessel, as by seamen for their wages, by the owners of an injured vessel against one in fault in a collision, by the salvors of a ship or cargo which they have rescued, etc. In many states *statutory liens* are given to mechanics, builders, and furnishers of material upon the buildings constructed or repaired by them.

Lieutenant, one who acts as the representative of another. In the U. S. army and marine corps a lieutenant is a commissioned officer below the rank of a captain. There are two grades, those of first and second lieutenant. Second lieutenants are the lowest in rank of commissioned officers. A lieutenant of the U. S. navy takes rank with a captain in the army. His office is next higher than that of lieutenant junior grade, and next below that of lieutenant commander. A lieutenant general in the army ranks next below a general and next above a major general. His rank is equivalent to that of a vice admiral. Lieutenant colonels in the army rank next below colonels and next above majors; their rank corresponds with that of commanders in the navy. Lieutenant commanders in the navy rank next below commanders and next above lieutenants; their office corresponds with that of majors in the army.

Lifeboat, boat constructed especially for the escape of persons from vessels wrecked or in jeopardy. As long ago as 1777 M. Bernières, of Paris, projected a vessel for inland and short sea voyages, and his experimental craft showed such resistance to capsizing that it must have embraced some of the leading features of the modern lifeboat. The inventor of the latter



LIFEBOAT.

was Lionel Lukens, who, November 2, 1785, secured an English patent on his improvements. The invention of Lukens displayed the salient and essential features of the lifeboat of today. It was copied in principle by another projector, Henry Greathead, who put the invention into successful use, 1790. Greathead's boat was constructed with cork floats arranged in and around the sides and gunwales. Abt. 1805 Christopher Wilson proposed to make the gunwales hollow, and to divide them into com-

partments, so that injury to one portion would leave the other intact. This addition to Luchen's invention was a judicious adaptation of the Chinese system of forming a vessel in a number of watertight chambers.

The same principle is embraced in the lifeboats of Joseph Francis, a native of the U. S., which are made of sheet metal, and are used at the life stations on the coasts of the U. S. It is also embraced in the boat of the Royal National Lifeboat Institution of Great Britain. This craft is about 30 ft. in length and 8 ft. wide, with its ends 2 ft. higher than its central portion. It has, like previous boats, an iron keel. This keel weighs 800 lbs. On each side are air-tight chambers. The floor of the boat is about coincident with the water line, and the space between it and the bottom is filled with cork, etc. The Francis lifeboat is peculiar in the method of its construction, being formed of two pieces of metal, each brought to shape in dies, operated by powerful hydraulic presses, the two halves being afterwards firmly secured together. The material is sheet copper; it is corrugated by the dies, so as to give great longitudinal strength and stiffness; the boat is provided with a number of watertight air chambers or compartments to insure its buoyancy. This is the boat now in use.

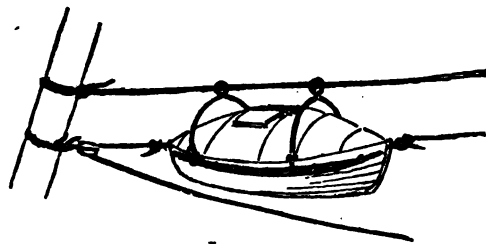
The life car is a kind of boat, closed in on top, and designed to be drawn through the surf between the vessel and the shore. To do this a hawser is stretched from one point to the other; the car is attached to the hawser by rings provided on the free ends of suspending chains fixed to the ends of the car. A line attached to each extremity of the car enables it to be drawn to and fro. The life car used in the U. S. was also devised by Joseph Francis. In the U. S. Life-saving Service the various craft of this kind are known as the surfboat, the self-righting and self-bailing lifeboat, the power lifeboat, the power launch, and the river life skiff.

Life Insurance. See **INSURANCE.**

Life-preserver, small buoy designed for attachment to the person, made of canvas or other fabric stuffed with cork, or of India rubber and inflated with air. Annular life-preservers are simply large rings, either of inflated rubber or cork-stuffed canvas, the hole in the center being large enough to receive the waist of the wearer, the device being worn beneath the arms. Although its clumsy form interferes with free movement of the arms, its simplicity and strength make it generally adaptable. The best are made of solid cork instead of granulated cork. Block life-preservers are made so that the fabric rests on the shoulders, and the blocks, one on the breast and one on the back, are held close to the body by suitable strings. Stools, mattresses, etc., are often made buoyant with a view to their use as life-preserving floats when thrown upon the water. The British gold-medal life-preserver, a combination of bust and waist plans, and similar forms are required to be carried by American vessels. Rubber vests, to be inflated with air through a tube and mouthpiece, have been de-

vised, and an air-filled waterproof dress has been used. At night an automatic device by which the throwing overboard of the life-preserver ignites a fuse which cannot be put out by the water shows by its light where the ring is floating. The fuse is so composed that a column of dense smoke shows its whereabouts by day.

Life-saving Service, term specifically used to designate organized equipment and effort for the saving of life in case of wrecks upon the seashore, or upon the shores of lakes or rivers. With the exception of about fifty stations supported by the Danish Govt., mainly on the coast of Jutland, and a few on the coast of Belgium, this service of the U. S. was long the only government establishment of the kind in the world. The task of marine life saving in Great Britain, France, Germany, and other European countries, is left entirely to private societies, except that in Great Britain the Coast Guard, under the direction of



LIFE CAR.

the Board of Trade, is charged with the operations at rescues attempted by the use of line-carrying rockets. The institution in the U. S. gradually grew out of the sentiment created by the terribly fatal disasters on the Atlantic seaboard, more particularly those on the coasts of Long Island and New Jersey during the first half of the nineteenth century. For nearly fifty years these frightful wrecks, often of the emigrant ships of those days, occurred without remedy. In 1848, following a grievous disaster, an appropriation of \$10,000 was made, with which eight buildings were erected on the coast of New Jersey and equipped with boats and some other life-saving appliances. These, and other stations established shortly afterwards, were without crews, but their value became so evident that crews were provided for them, and their number and the completeness of their equipment have been gradually increased, until in 1908 there were 280 stations fully supplied with the best-known appliances. Of these, 201 were on the Atlantic coast; 61 on the Great Lakes, including one at the falls of the Ohio, Louisville, Ky.; 18 on the Pacific coast, including one at Nome, Alaska.

Under the organization effected by the years of effort since 1871, the ocean, lake, and Gulf coasts of the U. S., covering an extent of 10,000 m., were laid off into several life-saving districts. Each of these, up to 1915, was governed by a local superintendent of its operations. Over all were a general superintendent and an

assistant general superintendent, stationed at Washington.

The enormous value of this service is most strikingly set forth in the official report of operations in a single year, *viz.*: Number of disasters, 848; value of property involved, \$15,041,140; value of property saved, \$12,266,100; value of property lost, \$2,775,040; number of persons on board, 5,320; number lost, 29; number succored at stations, 811; number of vessels totally lost, 49. In addition, 174 vessels were warned of danger by the signals of the policemen and watchmen of the service in time to escape disaster. The surfboat was used 924 times, making 1,224 trips and landing 1,026 persons; the lifeboats 113 times, making 157 trips and landing 218 persons; the power launches 120 times, making 130 trips and landing 213 persons; the breeches buoy 15 times, making 207 trips and landing 189 persons. The station crews rescued 42 persons connected with vessels, without the aid of boats or other life-saving equipment, and 66 not connected with vessels. The total number of disasters, 1871-1908, was 18,411; number of persons involved, 127,395; lives lost, 1,194; value of property involved, \$65,046,509; value property saved, \$211,124,032. Under an act of Congress, approved Jan. 28, 1915, the life-saving service was consolidated with the revenue cutter service under the name of the U. S. coast guard, and made a part of the military force of the country, to be under the orders of the Secretary of the Treasury in peace and the Secretary of the Navy in war.

Lifts. See ELEVATORS.

Ligament, any one of many structures in the animal organism whose function is to hold other organs in their places. The *articular* ligaments are found in most of the movable joints. They consist in most cases of white fibrous tissue, which is very flexible, tough, and inelastic. Some, like a part of the ligaments of the vertebrae, are partly of yellow fibrous tissue, which is very elastic. Articular ligaments are *capsular* when they invest a joint on all sides; *fascicular*, when they are flat bands of fibrous tissue passing from bone to bone; *funicular*, when they are rounded cords. Many of the viscera (as the liver, mammary gland, uterus, bladder, etc.) have ligaments holding them in place. Some are *suspensory*, receiving the weight of the organ; others are *lateral*, acting as guys or stays to prevent lateral displacement. Folds of peritoneum or slips of fascia serve as ligaments for the viscera.

Li'gan, goods that have sunk in the sea, but are attached to a buoy, in order that they may be recovered. Bracton applies the term to goods found in the sea so far from shore "that it cannot be proved to what land or district they are to be referred," and declares that they "belong to the finder, because they may be said to be no man's goods." Before the time of Lord Coke the doctrine was established that such goods were not abandoned or derelict, but could be recovered by the owner on paying reasonable salvage if anyone had become

entitled thereto, and if he did not claim them they belonged to the Crown. See **FLOTSAM**.

Liga'tion and Lig'ature, in surgery, the operation, and the cord or band used in the operation, of tying blood vessels, to prevent hemorrhage, or in the strangulation of a tumor or the like. The ligature was described long before the circulation of the blood was discovered, the first account of its use having been given by Susrutas, 1500 B.C. The Arabian physicians were familiar with it. After them the Italian surgeons continued to use it, and to describe its applications and modifications. Its use is generally ascribed to the French surgeon Ambroise Paré, 1517-90, who championed its more extended use. Ligatures are made of metallic substances, as silver or iron wire; of vegetable material, as of rubber, hemp, or linen; and of animal tissues or products, as silkworm gut, catgut, and silk. Strips of kangaroo tendons or of ox aorta are occasionally used by surgeons. Whatever material is employed must needs be first aseptic, *i.e.*, free from all infectious material, otherwise there is danger of suppuration or of blood poisoning. Metallic ligatures are rarely used. They may be left buried in the deep tissues, there to remain, but will never become absorbed. On the other hand, vegetable fiber very slowly disappears, often at least, if not invariably; the same is true in less degree of silkworm gut. Catgut is the most readily absorbable of all material used for ligature.

Light, the agent by which the eye is enabled to see material bodies. Bodies are seen by means of the light proceeding from them to the eye in straight lines. The light may originate with the visible body, which is then called a "source" of light (a flame, an incandescent filament, etc.), or it may merely reflect the light coming from a source, such as the sun. In this latter way most objects are seen. Light was formerly supposed to consist of tiny corpuscles given off by the source. A "ray" of light was then the path of one of these corpuscles, moving in a straight line, like a projectile. Light is now known to consist of waves, and the medium in which these are propagated has been named the "luminiferous ether." The motions constituting these waves are now understood to be electric fluxes and the waves are believed to differ from the electro-magnetic waves used in wireless telegraphy only by being very much shorter. They are also identical with the waves of radiant heat. (See **HEAT**.) A "ray" of light, therefore, has no objective existence, but is merely the direction of advance of the wave point.

Light proceeds usually from a hot body. As the temperature of a body increases it gives off radiation, at first only of great wave length, then of shorter and shorter wave lengths in addition to those previously emitted. The first or long-wave radiation does not affect the eye, but is appreciable from its heat effects. The first visible radiations that appear are the red, then those of shorter wave length are added, until the body is "white hot" and gives off all the colors of the spectrum. Light is also occasionally due to phosphorescence—the



TYPE OF FIRST U. S. LIFE-SAVING STATION.



READY FOR BOAT DRILL.



McLELLAN BEACH APPARATUS CARRIAGE.



BEACH APPARATUS DRILL.



SECTION OF McLELLAN APPARATUS CARRIAGE.
READY TO FIRE GUN. (ATLANTIC CITY STATION.)



FIRING LYLE GUN.
(ATLANTIC CITY STATION.)



36-FT. POWER LIFEBOAT.



LAUNCHING LIFEBOAT.

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emission of light by certain bodies after exposure to sunlight and removal to a dark place—to show oxidation, as in decaying wood, to vital activity, as in the firefly or glowworm, and to electric action, as when a current is passed through a partially exhausted tube. Light from any source proceeds in straight lines until it meets some material body. It

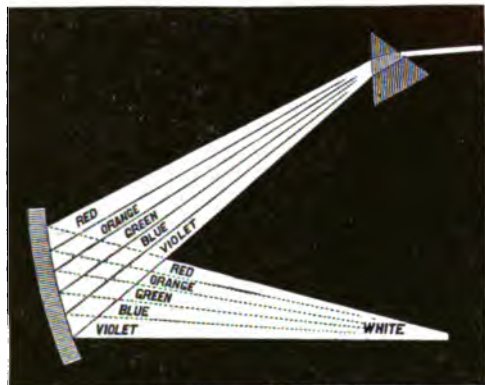


FIG. 1.—DECOMPOSITION OF WHITE LIGHT.

may then be reflected, absorbed, or transmitted; generally all three actions take place and the greater portion is absorbed, except in gases, where the light is almost all transmitted.

Where light is transmitted obliquely, the direction of the wave front (or "ray") is altered, owing to the change in velocity in passing from one medium into another. This alteration in direction is called *refraction*. The laws of *refraction* and *reflection* are treated under OPTICS. The length of light waves va-

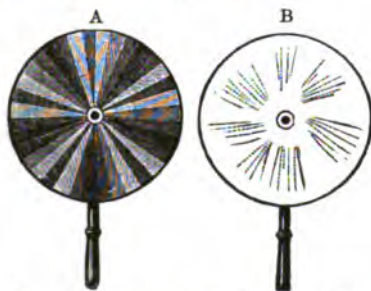


FIG. 2.—A, NEWTON'S DISC. B, DISC ROTATING.

ries with the color of the light. White light consists of a mixture of all colors. As the waves of different lengths are differently refracted, passage through a prism separates these colors and spreads them out over a band called the spectrum, red being the least refrangible color, and then in order, orange, yellow, green, blue, and violet. The invisible waves less refrangible than the red (of greater wave length) are called *infra-red*, and those beyond the violet (of smaller wave length) are called *ultra-violet*. The latter, though not directly visible, cause fluorescence in various substances. (See FLUORESCENCE.) Just as

two sound waves when in opposite phases may cause silence, so two light waves superposed may produce darkness. This is called *interference*. To produce absolute darkness the waves must be half a wave length apart and of the same length (the same color). The conditions necessary for interference are satisfied when such light passes through a narrow slit or is reflected from a thin film (as a soap bubble). If white light is used the dark bands due to interference fall in different places, and the result is a band of colors called an *interference spectrum*.

The movements constituting a light wave take place ordinarily, according to the undulatory theory, in all directions in planes parallel to the wave front. If all of these motions are suppressed except those in one definite plane, perpendicular to the wave front, the light is said to be *polarized* in that plane. Polarization cannot be detected by the eye, but polarized light will pass through crystals only in certain directions. By examining a ray of light through such a crystal and slowly rotating it, polarization may be detected. Light may be polarized by passage through crystals or by reflection. The velocity of light is so great (299,860 kilometers per second in a vacuum) that it cannot be detected by ordinary observation and experiment. It was first measured astronomically by observation of the eclipses of the satellites of Jupiter. The velocity may now be detected and measured in the laboratory by very delicate methods of which the best uses a swiftly revolving mirror. A ray of light is reflected by this to a distant point and back. If the mirror remained still during this period it would send the ray back exactly to its point of origin; but when the mirror is set in motion the ray is slightly deviated, showing that the light has taken time to go to the distant point and back, during which time the moving mirror has slightly changed position. The length of the ray's path, the velocity of the mirror's rotation, and the deviation of the ray, furnish data for calculating the velocity of light. See ACTINISM; OPTICS; REFLECTION; REFRACTION.

Light'foot, Joseph Barber, 1828-89; English biblical scholar; b. Liverpool; tutor at Trinity College, Cambridge, 1857-61; Hulsean Divinity Professor, 1861-71; Canon of St. Paul's, 1871-79; Bishop of Durham after 1879. His works include commentaries on Galatians, Philippians, and Colossians, each with a revised Greek text; "Two Epistles to the Corinthians of St. Clement of Rome," with appendix containing the newly recovered portions in 1877; "Epistles of St. Ignatius," "Dissertations on the Apostolic Age," "Apostolic Fathers," "On a Fresh Revision of the English New Testament," an explanation of the work of the New Testament company of Bible revisers, of which he was a member.

Light'house, elevated structure, usually tower-shaped, containing light so modified and directed as to present to the mariner an appearance which shall at once enable him to judge of his position during the night, as the sight of a landmark would do during the day.

LIGHTHOUSE

As the mariner's eye is usually assumed to be 15 ft. above the sea level, we must add this distance to that corresponding to the elevation of the light to ascertain its range of visibility. A light 100 ft. high would have a range of about 16 nautical m. Other essentials to the tower besides that of light bearing are that the light be accessible to the "keeper," and that there be "apartments" not only for the keeper's residence, but for preserving the supplies for his needs and for the maintenance of the light.

The first light-bearing tower of which we have record, built by Ptolemy Philadelphus abt. 300 B.C., figures as one of the Seven Wonders of the World of the

ancients. During the Middle Ages the "aids to navigation" were meager, and the earliest tower which claims attention is the Tour de Cordouan, built (1584-1610) on a reef at the mouth of the Garonne. The earlier lighthouses were confined to convenient locations on the land, but these were useless as a warning against the isolated rocks or sunken reefs distant from the mainland, such as the famous Eddystone, in the English Channel, where was established the first stable tower. This was first erected 1696-1700; was washed away 1703, rebuilt 1706-9, burned 1755; this, as well as the earlier structure, having been of wood, though the second had a stone base. It was rebuilt 1757-59 of blocks of Portland oolite, encased in granite, the granite

dovetailed into the solid rock.

The tower was

85 ft. high; the light, a fixed one, 72 ft. above the water, could be seen for 13 m. The wearing away of the rock necessitated a new lighthouse, and this was built on another part of the reef, 1879-82. Its light, 133 ft. above the sea, is visible at a distance of 17½ m. The subsequent structures of Bell Rock (1808-11), situated in the channel way to the entrance of the Friths of Forth and Tay, and Skerryvore (1838), off the W. coast of Argyllshire, Scotland, are only inferior to the Eddystone in fame. Other "rock lighthouses" deserve mention—e.g., Bishop Rock, off the Scilly Islands; The Small Rocks, entrance to Bristol Channel; Hanois Rocks, island of Alderney; Barges d'Olonne, W. coast of France; Heaux de Brehat, N. coast of France; Wolf's Rock, off Land's End, England; and Alada



FIG. 1.—MINOT'S LEDGE LIGHTHOUSE, NEAR BOSTON, MASS.

LIGHTHOUSE

Reef, Bay of Bengal. The first lighthouse in the U. S. was erected, 1716, on the N. side of Boston harbor. The Treasury Department of the Government was vested with the care of these constructions, but, 1852, a lighthouse board was organized, with the Secretary of the Treasury as president.

The first cast-iron lighthouses, valuable for remote and inaccessible points because they can be completed at the workshop, were two constructed in England for the islands of Bermuda and Jamaica. Another kind is the wrought-iron pile lighthouse. The lower ends of the iron piles are fitted with large cast-iron screws and screwed through a soft foundation to a firm bearing, or, if the foundation is hard clay, these ends are sharpened and driven until they come to a firm bearing on cast-iron disks

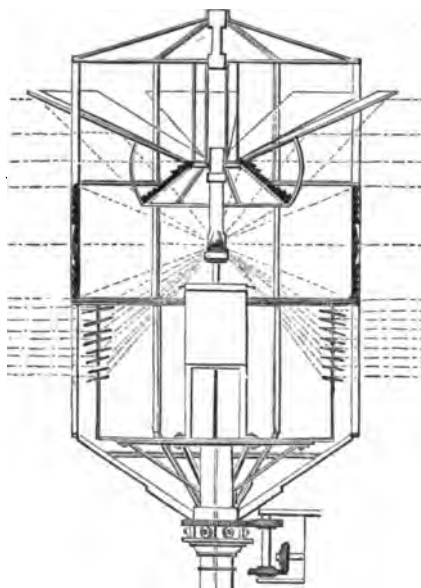


FIG. 2.—FRESNEL'S APPARATUS DESIGNED FOR THE CORDOUAN.

which bear on shoulders forged on the piles. A fourth form of light-bearing construction is the floating lighthouse or lightship, anchored at places where the construction of a lighthouse would be impracticable or impossible. The ship is strongly built and lighted by a series of lamps with parabolic reflectors encircling the mast, and so arranged as to throw their light all over the horizon. To obtain a flashing light on a lightship was a difficult problem until the electric light gave a simple solution. Whenever it is possible to do it these vessels are provided with a sound signal, as in the U. S. a steam whistle, in France a siren. Some buoys are lighted by gas or electricity. The electric buoy is a "spar" (shaped like a ship's spar), having a 100-candle power incandescent light at its upper end, the current being supplied from a shore station.

Wood and coal, the first fuels used for lights, were followed by wax and tallow candles

(used in several Scandinavian lighthouses as late as 1846), which were in turn superseded by solid-wicked lamps, burning animal and vegetable oil. Since 1879 mineral oil has been universally in use, gas being employed to only a limited extent. The application of electricity to lighthouse illumination has received an immense development in recent years. Since 1863 electric lights have been maintained at both houses of La Hève, and this kind of light has come more and more into common use. The currents are produced by magneto-electric machines, worked by steam engines, and are

carried by conducting cables to the regulators or electric lamps used to regulate the separation of the carbon points between which the light is produced.

Lighthouse apparatus is divided into several orders, depending on the focal length in each case. The orders are 1st, 2d, 3d, 3½, 4th, 5th, and 6th. Their use is governed by the importance of the site occupied by the lighthouse. The first-order lens is the largest. A light of this order is placed on very important points of the coast, such as a marked headland, the entrance to an important harbor, to mark some special obstacle, etc. The second- and third-order lenses are placed at less important points.

The third-and-a-half and lower orders are rarely used as coast lights. They come under the general head of interior or harbor lights. The focal length of each size of lens is: Of the first order, 36.25 in.; of the second, 27.58 in.; of the third, 19.70 in.; of the third-and-a-half, 13.78 in.; of the fourth, 9.35 in.; of the fifth, 7.39 in.; of the sixth, 5.91 in.

The concentration of the rays of light given off by the source is accomplished by three main systems: (1) The catoptric, used chiefly on lightships, in which the rays are reflected back from a properly shaped mirror without being parallelized. The first reflectors were segments of spheres. Teulère, 1783, introduced the paraboloidal reflector and placed the lamp in its focus, and accomplished the flashing or eclipse light by placing several lights, with their reflectors, on the outside of a polyhedral clockwork. (2) The dioptric system, first proposed and put into successful operation by Fresnel, in which a lens refracts or bends back the rays passing through it. His system is based on the optical principle of the convex lens, that rays of light emitted from a lumi-

nous point at its principal focus, striking the lens, are refracted in passing through it, and but for the effects of spherical aberration would emerge in a direction parallel to its axis. The necessity of having at the focus of the lens a powerful light led to the no less important invention of the four-wicked mechanical lamp. (3) The catadioptric system, in which the mechanism for both reflection and refraction is employed. Fresnel commenced the execution of a fourth-order apparatus, embodying an improvement for parallelizing the rays by means of totally reflecting catadioptric rings, three of which he arranged below and five above the central drum, instead of horizontally, the latter forming a dome, through the upper part of which the lamp chimney passed. These rings produced a fixed light, more or less dim, which could be seen between the flashes, so that the light had the same appearance as that of a fixed light, varied by flashes. Stevenson devised further a plan to do away with the metallic reflectors and horizontal totally reflecting rings and to increase the intensity of the flashes by concentrating all the available light in the flash itself. Hence the name *holophotal*. See Fig. 3.

The French engineers of the lighthouse service give more attention to increasing the duration than the intensity of the flashes of the flashing lights. A most important feature in the Fresnel lenticular apparatus is the lamp. The lamps generally used in the higher orders of apparatus to illuminate the entire horizon combine the principles of the double-current-of-air burner, multiple concentric wicks, and the mechanism of pumps worked by clock machinery for supplying a superabundant quantity of oil. Another apparatus constructed by Fresnel was that which produced a fixed light, varied by flashes at regular intervals. This he made by establishing on the outside of an ordinary fixed-light apparatus a subsidiary one which revolved around the other.

In order to protect the illuminating apparatus, the lighthouse tower is surmounted by a lantern, in which the light is placed, the size of which is determined by the order of the light. The base, uprights, and dome are generally made of copper or iron and the sides are glazed with heavy plate glass. It is important that it should be well ventilated. The luminous intensity of a light is measured by means of a photometer, the unit of measurement in some countries being the light of a Carcel lamp consuming a certain quantity of oil per hour, and in others a sperm candle of fixed dimensions which consumes a certain number of grains per hour. The distance at which a light may be seen is termed its "range." The form of the earth's surface introduces another element in the problem of determining the value of the range—that of the height of the light above the level of the sea. We thus have the theoretical or luminous range and the practical or geographical range.

Light'ning, illuminating flash produced by the discharge of atmospheric electricity, either

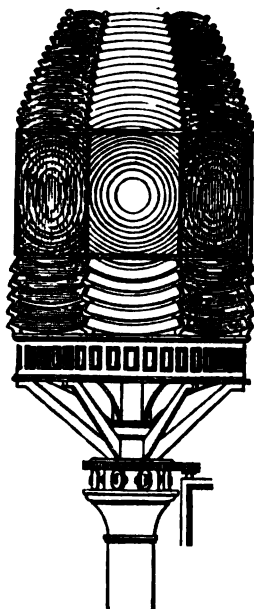


FIG. 3.—FIRST-ORDER HOLOPHOTAL CATADIOPTRIC APPARATUS.

between two clouds, or between a cloud and the earth, usually accompanied by a noise called thunder. It manifests itself in various forms, which have been called forked, zigzag, ball,

nothing. Even the earlier electricians did not suspect the identity of lightning and electricity. The Abbé Nollet, 1746, first drew attention to the similarity of effects exhibited by thunder



FIG. 1.—CROOKED PATH OF LIGHTNING DISCHARGE. (From a photograph by O. S. Blakesley.)

clouds and the prime conductor of an electrical machine. Franklin established the fact first by enumerating in a clear and methodical manner the various points of resemblance, and the similar effects produced by each, and finally by actually conducting the lightning to the earth in his well-known experiment with the kite in Philadelphia. Dalibard in France, acting according to the instructions of Franklin, May 10, 1752, obtained electrical sparks from an iron rod 40 ft. high in the garden at Marly, and charged Leyden jars from the same source. Franklin did not make his experiment with the kite till June 15th of the same year. The electrical condition of the atmosphere during thunderstorms is thus established, and it appears that the atmosphere is almost always positively electrified in relation

to the surface of the earth, and the higher the stratum of air the more decidedly positive is its electrical condition. Atmospheric electricity is developed by evaporation and by currents of wind rushing past each other, or against opposing objects. The sheet, and heat lightning. Zigzag lightning is produced by the discharge of a large quantity of electricity from a cloud through a resisting medium, which becomes compressed at various points and thus turns the current aside. Experiments demonstrate that the more air is rarefied, other things being equal, the more readily will it permit the passage of the electric current, except when a nearly perfect vacuum is produced; and the more it is compressed the more resistance it offers. Ball lightning occurs during an extremely intense discharge. Sheet lightning has the appearance of a diffuse glare of light, sometimes illuminating the edges and sometimes the whole surfaces of clouds. It may be caused by a stroke of zigzag lightning at a great distance, sending its light through great thicknesses of clouds, so as to give it the appearance of diffuseness; or it may result from the passage of electricity of no great tension from particle to particle, like that produced in discharging an electrical machine over the surface of a bedewed pane of glass. Heat lightning differs but little from sheet lightning, being produced in the same two ways. When produced by the reflection or transmission of zigzag lightning, thunder is not heard, on account of the distance. Sound travels about 1,100 ft. per second, so that thunder following lightning after an interval of five seconds is due to a discharge a mile away, the interval becoming less and less as the storm approaches.

Of the nature of lightning the ancients knew

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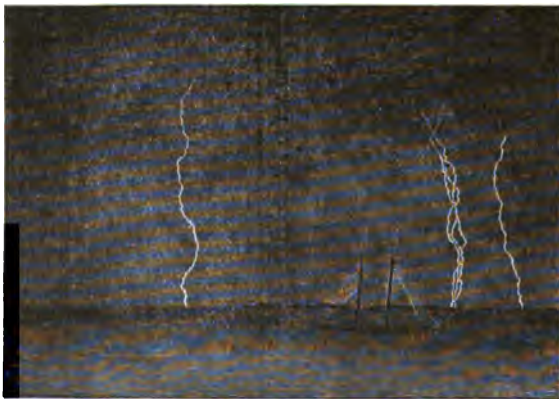


FIG. 2.—THE MULTIPLE FLASH. (From a photograph by Dr. H. S. Pifford.)

descent of the raindrops develops negative electricity in the air, and the same effect is observed in the vicinity of waterfalls, the air for several hundred feet distant being filled with negative electricity. Franklin, having satisfied himself of the identity of lightning and electricity, was not long in drawing from his discovery practical results of importance in pro-

tecting buildings from the stroke of lightning, and he announced in his *Poor Richard's Almanac* for 1753 his invention of the lightning rod.

Lightning Bug. See **FIREFLY**.

Lightning Rods, or Lightning Conductors, metallic rods attached to buildings or ships for the purpose of protecting them from the effects of lightning. The famous experiments of Benjamin Franklin doubtless suggested the use of such devices. The principal ideas which have been in vogue with reference to protection from lightning, and upon which nearly all lightning conductors since Franklin's day have been based, are two: The dissipation of the induced charge by the well-known action of points, and the carrying away to earth or water in a harmless manner of such portions of the discharge as may include in its path the building or vessel to be protected.

The important question of the degree of protection afforded by lightning rods is still an open one. Increasing knowledge of the phenomena of atmospheric electricity and of related phenomena in the domain of electrostatics, however, has made it possible to draw certain conclusions. Damages from lightning are of two distinct classes. The first includes damages arising from the direct action of the main discharge; the other class comprises the secondary effects, due to the restoration of equilibrium, temporarily disturbed, between bodies in the neighborhood of the main path. The cases in which lightning rods have to deal with the main discharge are, however, comparatively rare; that is to say, the number of instances in which buildings lie in the neighborhood of the path of discharge without forming a portion of it are much more numerous than those in which the flash passes directly through the structure itself. For the protection of buildings from these secondary effects the efficacy of lightning rods is unquestionable, and, so far as this sort of protection is concerned, certain general statements as to their construction may be laid down:

First. The dissipating action of points is very small. It is doubtful whether points possess any practical efficacy. *Second.* The lower end of the systems of rods should be well grounded. In buildings containing water pipes a satisfactory connection with the earth can be obtained by attaching the system of lightning conductors to these pipes. *Third.* Gas pipes should not be used as a means of establishing a connection with the earth. Gas pipes are likely to cause fires by the ignition of their contents at any point where there is a leak. *Fourth.* All portions of the structure containing considerable masses of metal, such as the sheathing of roofs, and systems of pipes not connected metallically with the earth, should be so connected by attaching them to the lightning rods. *Fifth.* As regards the material of which lightning rods should be made, the metal of which they are constructed is of less importance than the form. Of course, metals readily fusible, such as lead, are not to be selected; and, since lightning rods are exposed to the weather, it is desirable to have them

constructed of metals which will be permanent. Ordinarily the choice limits itself to copper and iron; and iron is, on the whole, probably the best available material. For many years there was a controversy between those who held that the essential characteristic of lightning rods was a sufficient cross-sectional area, and that the shape of the cross section was a matter of indifference; and those, on the other hand, who held that the rod should be constructed so as to offer a large surface. It is now perfectly well established that sudden surges of current, such as pass over lightning rods at the time of discharge, are not capable of being conducted save by the outermost layers of the metal. This fact is accounted for by the self-induction of the material. Owing to this inductive action, which confines the current to the outside, tubes with thin walls are as good carriers of lightning as solid rods of the same diameter, while a broad strip or tape weighing the same per lineal foot as a rod or tube is much better than either.

Sixth. Insulation of lightning rods from the body of the structure which they are intended to protect is distinctly disadvantageous. The object of lightning rods is not so much to convey a discharge from the sky to the earth without permitting the same to utilize the building itself as a conductor, as it is to connect all those portions of the building itself which are conductors of electricity with the earth, so as to allow the transfer of electricity, under the tremendous inductive action of passing clouds, to go on without the production of dangerous sparks. *Seventh.* Lightning rods should be as nearly straight as possible. All coils and loops are to be avoided, because they possess self-induction sufficient to cause the discharge to leap across between the intervening portions of the conductor instead of going around through the metal.

The desirability or undesirability of attaching lightning rods to buildings is a question concerning which it would be difficult to lay down any general rule. In the case of ships at sea carrying wooden masts or spars, there can be no question of the importance of such protection against lightning. In the case, on the other hand, of a building situated upon some stratum which in itself affords insulation from the surrounding region of the earth's surface, it is a serious question whether a system of metallic conductors connecting the house with the earth would be a source of protection or of added danger.

The development of extensive systems of overhead wires for telephone and electric-lighting service has greatly modified the problem of protection from lightning, and has compelled the introduction of apparatus quite as important as the lightning rod. This apparatus is the lightning arrester, the object of which is to afford a path to earth for the electric charges which gather by induction upon such systems of wires. The function of the lightning arrester is primarily to protect the instruments (telephones, dynamos, motors, etc.) which are connected with the outdoor wires, but it also protects against fire the buildings which the wires enter. The system of wires

pertaining to a telephone exchange, for example, gathers charges of electricity over a wide area, and the discharge to earth is likely to occur through the ground wire of some building remote from the disturbance. A properly arranged lightning arrester will prevent this by keeping the potential of the entire system under control. Lightning rods are ordinarily brought into service only at rare intervals; the lightning arrester, on account of the extended network exposed to the inductive effects of thunder clouds, will be in action with nearly every passing storm.

Ligne (lèñ), **Charles Joseph** (Prince of), 1735-1814; Austrian general and diplomatist; b. Brussels; was descended from one of the wealthiest and most powerful Belgian families; entered the Austrian army, 1752, distinguished himself in the Seven Years' War, and commanded the vanguard in the Bavarian War of Succession. During the reign of Joseph II he held the highest military and diplomatic positions, and the elegance of his manners and the brilliancy of his conversation made him a favorite with all European courts. Under Leopold he fell into disfavor, and though Francis I made him field marshal, 1808, he never regained his influence in the state. His letters and memoirs have considerable historical interest.

Lignite, name originally given to bituminized wood, but now applied to most coals which occur in the more recent geological formations; the term is therefore synonymous with brown coal. Lignite has no definite formula of composition. Different specimens vary much in physical and chemical character, shading into unchanged vegetable fiber above and true coal below. Lignites or brown coals are found chiefly in the Cretaceous and Tertiary formations. Here they occur in deposits which rival in area and thickness the coal beds of the Carboniferous system. In general terms, it may be said that the lignites occupy an intermediate position, both in date and composition, between the peat which is now forming and true coals of Palæozoic age, and represent a stage in the progressive distillation which vegetable tissue passes through when buried. This process results in the formation of (1) peats, (2) lignite, (3) bituminous coal, (4) anthracite, (5) graphite. No sharp lines of demarcation separate these groups, as they are found shading into each other by all possible intermediate phases. Since they are successively derivatives one from the other, the series is necessarily continuous. See **COAL**.

Lignum-vitæ (lġ-nŭm-vi'tē), wood of the *Guaiacum*, a genus of trees, natural order *Zygophyllaceæ*, of which the important species are *G. officinale* and *G. sanctum*, small evergreen trees, with blue flowers, growing in the W. Indies and adjacent mainland; is exceedingly hard and heavy, sinks in water, and is much used in manufactures, as for ship blocks, tenpin balls, etc. It is exported from the W. Indies in logs or billets, of which the sapwood is yellow and the heartwood greenish brown. It has a peculiar odor when rubbed or heated. *G. resin*, or *guaiac*, is the concrete juice of the

same tree, obtained from the wood, and also exported from the W. Indies. It comes in deep greenish-brown or olive-colored, brittle, resinous masses, of feeble fragrant odor, and, after melting in the mouth, of a hot, pungent taste. It is a complex body, containing three acids, a peculiar resin, and other substances. It is



GUAIACUM OFFICINALE.

completely soluble in alcohol, forming a deep-brown tincture. Guaiac readily oxidizes on exposure, turning green, and from the change of color produced by contact with some animal and vegetable substances is useful as a chemical test, as for detection of blood in stains. It is used sometimes in medicine as a so-called "alterative" in rheumatism and syphilis, and as an emmenagogue and sudorific. *G. sanctum* grows in Florida.

Ligor', state, town, and isthmus of the Malay Peninsula; state is feudatory to Siam, and extends across the peninsula; area, 17,000 sq. m.; pop. abt. 150,000, three quarters Siamese, the rest Malays, Chinese, and the aborigines of the forests. The principal productions are rice, pepper, rattans, dyewoods, ivory, tin, and gold. The town and capital is near the E. coast, on a wooded plain, near the mouth of a small stream, forming a good harbor. The isthmus forms the N. part of the state; has long been a favorite place for crossing the peninsula; distance, 70 m.

Liguori (lġ-gŏ-ŏ'rġ), **Alfonso Maria da**, 1696-1787; saint of the Roman Catholic Church; b. near Naples; was originally a lawyer, but became a priest, 1722; devoted himself to the instruction and reform of the ignorant and vicious classes, and founded an order for that purpose, 1732. In 1762 he was made Bishop of Sant' Agata dei Goti. He was a warm opponent of Jansenism and rigorism, and published several theological and devotional works; canonized May 26, 1839; day, August 2d.

Ligŭ'ria, in ancient geography, a district of N. Italy; the land of the Ligures, the boundaries of which were not accurately defined until the time of Augustus. According to his division of Italy, it comprised the territory from the Ligurian Sea across the Maritime Alps to the Padus (Po) in the N. and from the Varus

in the W. to the Macra in the E. When first mentioned in history, the Ligures occupied a much larger territory, extending far into Gaul, on the W. side of the Rhone. They were a warlike, quick-witted, and enterprising people, whose origin and relations are entirely unknown. Liguria formed the nucleus of the Roman province of Gaul. The name was renewed by Napoleon, 1797, when the republic of Genoa was transformed into the Ligurian Republic, but the absorption of the little state in the French empire, 1805, destroyed its autonomy, and its territory became for a time the three French departments of Apennin, Genoa, and Montenotte.

Li Hung-Chang (lě hōng-chāng), abt. 1821-1901; Chinese statesman; b. Hofei, province of Nganhwei; attained the degree of Chin Cze (the third), 1847; was appointed a compiler of the second class in the Hanlin College, and, 1850, compiler in the imperial printing office. In the Taiping rebellion he conducted the final campaign that crushed the revolt; was equally successful against the Nienfei rebels, whom he completely overthrew, 1868. In 1870 he was appointed Viceroy of Chili and made Senior Grand Secretary of State. In the face of opposition he brought about the introduction of the telegraph, the reorganizing of the army on European models, the establishment of dockyards and arsenals, and the construction of railways. In 1896 he represented the Emperor of China at the coronation of the Czar, and on his way back to China visited the principal countries of Europe and the U. S., and, 1900, was appointed to negotiate for peace and the settlement of the questions growing out of the Boxer uprising.

Lil'ac, popular name of shrubs of the genus *Syringa*, of the olive family. The best known is the common lilac, *S. vulgaris*, a native of central Asia, half naturalized in Europe and the U. S. Its early blooming flowers are commonly of the tint called lilac, but often are white or dark purple. *S. persica*, *S. chinensis*, with other species and their hybrids, are common in cultivation.

Lil'burne, John, 1618-57; English political agitator; b. Thickney Puncharden, Durham; imbibed in youth opinions hostile to the Church of England, and having circulated pamphlets against the bishops, was condemned, 1638, to pay £500, to receive 500 lashes, to stand in the pillory, and be remanded to prison. He fought in the Parliamentary army at Edgehill, Brentford, and Marston Moor, and was thrown into Newgate for libeling the Presbyterians. He afterwards aided in organizing the Levelers; accused Cromwell and Ireton of designs on the sovereignty; was, 1649, tried for sedition and acquitted; took refuge in Holland; returned, 1653; joined the Quakers.

Liliuokalani (lě-lě-wō-kā-lā'ně), **Lydia Kamaheha**, 1838-1917; ex-Queen of the Hawaiian Islands; married John O. Dominis, a native of Boston, Governor of Oahu (d. 1891). She had been made vice regent when King Kalakaua left Hawaii for the U. S., and soon after his death in San Francisco she was proclaimed queen, January 29, 1891. Her efforts to abol-

ish the constitution of 1887 and to restore the more absolute power of the crown caused her overthrow, January 30, 1893, by a small portion of the population, consisting chiefly of the U. S. element. Pres. Cleveland attempted unsuccessfully to mediate between the provisional government and the queen, with a view to her restoration.

Lille (lěl). See **LISLE**.

Lil'ly, John. See **LYLY**.

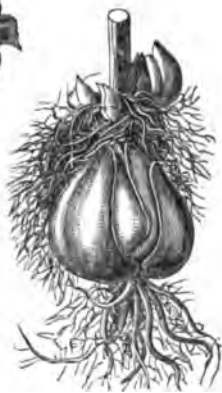
Lil'y, or Lilly, William, 1466-1529; English educator; b. Odiham, Hampshire; founded a grammar school in London, 1509, and was apparently the first who taught Greek in that city; in 1512 was appointed high master of St. Paul's School. He was the author of several educational works, among them "Brevissima Institutio seu Ratio Grammatices Cognoscendæ," commonly known as Lily's "Grammar," in the compilation of which he was aided by Dean Colet, Erasmus, and Cardinal Wolsey. It was the accepted grammar in the English schools for more than three centuries, and is still used in St. Paul's School.

Lilybæum (originally the name of the cape which forms the W. extremity of Sicily), the modern Marsala; built by the Carthaginians abt. 350 B.C. At the close of the first Punic War it was made over to Rome, and became the basis for her attacks on Africa.

Lil'y Fam'ily, group of monocotyledonous plants characterized by a regular complete perianth, free from the three-celled ovary, and six stamens. They are mainly herbaceous, and with the six divisions of the perianth colored alike and the leaves parallel-veined; but to all



THE LONG-FLOWERED LILY
(*Lilium longiflorum*).



BULB OF LILY.

these characters there are exceptions. Many have bulbs, others tubers or root stocks. A few are arborescent, such as the larger yuccas, and especially dragon trees. The famous dragon tree of Orotava, Teneriffe (overthrown, 1868), was regarded as one of the oldest trees in existence. As now received, the family comprises fully 2,300 species, widely distributed throughout the world, and constituting a

number of well-marked subfamilies (sometimes regarded as families). To this family belong the tulips, lilies, crown imperial, calochortus, and most of the well-known and prized ornamental plants of the order, as also the hyacinth and the onion tribe, the asparagus, and a popular conservatory climber, *Myr-*



GOLDEN-BANDED LILY (*Lilium auratum*).

siphyllum (falsely called smilax), *Convallaria* (the lily of the valley), *Polygonatum* (Solomon's seal), the medicinal and ornamental *Colchicum* (meadow saffron), *Veratrum*, the white hellebore and its allies, which furnish veratrine, the last named having very active acrid-poisonous roots or corms. The bitter juice of one or two species of *Aloe* furnishes aloes. One of the strongest of fibers is New Zealand flax, from the leaves of *Phormium tenax*.



LILY OF THE VALLEY (*Convallaria majalis*).

Lily of the Val'ley, a plant of Europe and Asia, also sparingly indigenous in the Alle-

ghany Mountains, prized in garden and greenhouse cultivation for its beauty and fragrance. Its scientific name is *Convallaria majalis*. It is used by perfumers as the basis of eau d'or.

Lima (lî'mă), capital of Allen Co., Ohio; on the Ottawa River; 71 m. N. of Dayton; is the center of the great Ohio petroleum and natural-gas fields; is one of the largest petroleum refining and shipping points in the country; has manufactures of railroad cars, locomotives, machinery used in the petroleum and wood-working industries, and large railroad repair shops; and is the seat of Lima College (Lutheran). Pop. (1910) 30,508.

Lima (lê'mă), capital of Peru and of the department of Lima; at the head of a plain forming a plateau where the river Rimac emerges from the spurs of the Cordilleras; 512 ft. above the sea; 6 m. from its port of Callao, on the Pacific. The city is regularly laid out, has thirty-three public squares, many of them handsomely adorned with statues and fountains; a cathedral, one of the largest and finest in America; a senate house (the old Palace of the Inquisition); Pizarro's palace, now used for government offices; the Univ. of San Marcos, founded 1551, which includes the College of San Carlos, founded 1770; several national colleges (high schools) and medical colleges, a mining and engineering school, a naval and military institute, a national library, and a mint. The Dos de Mayo Hospital is perhaps the finest edifice in the city. The Exposition Building, a kind of national museum, is a very handsome edifice. In the outskirts is a good botanical garden and a zoological garden. Lima is the commercial metropolis of Peru, Callao being, for practical purposes, a portion of it; the most important exports are silver, gold, vicuña wool, hides, sugar, cotton, and cinchona. The city was founded 1535; was the seat of the viceroys of Peru, who during the colonial period ruled nearly all of Spanish America; was the capital of the Peru-Bolivian Confederation, 1836-38. It has always been an important point during the Peruvian civil wars. In 1746 it was nearly destroyed by an earthquake, and it has been frequently injured since by the same cause. Pop. province (1908) 172,927. City pop. (1908) 140,880.

Lima e Silva (ê sê'l'vâ), Luiz Alves de (successively Baron, Count, Marquis, and Duke of Caxias), 1803-80; Brazilian military officer and statesman; b. Rio de Janeiro; became a brigadier general, 1828; President of Maranhão, 1840-41; subduing a formidable rebellion; became Vice President and military commandant of São Paulo, 1842, and quelled another rebellion. As President of Rio Grande do Sul, 1842-46, he put down still another formidable revolt. In 1851-52 he commanded the army which drove the dictator Rosas from Buenos Aires. He entered the Senate, 1855, and led the Conservatives; was Minister of War, 1855-56; Premier, 1856-57 and 1861-62; became marshal, 1862; commanded the Brazilian forces, 1866-69, during the war with Paraguay; was again Prime Minister, 1875-78. He was the only duke created under the empire.

Limassol (lă-mă-söl'), port in Cyprus; on S. coast; 40 m. SW. of Nikosia; and chief place of the district of Limassol. Here the Ottomans landed, 1571, and took the island from the Venetians. Gypsum, raw umber, raisins, brandy, and wine are exported. Pop. (1901) 8,298.

Lim'bo, or **Lim'bus**, word first used by the scholastic theologians of the Middle Ages to designate, as being on the outskirts of hell, that place in which the souls of the just who died before Christ's resurrection were detained. It was a place of rest and joy, though imperfect, to the saints of the Old Testament, till Christ delivered them and led them into heaven at the time of His ascension. It also means a place where the souls of infants that die without baptism are detained on account of original sin.

Limburg (līm'börg), or **Limbourg** (län-bör'), territory extending along both sides of the Meuse River, which belonged alternately to the Netherlands, Belgium, France, and Austria, until it was finally divided between Belgium and the Netherlands, 1839. Along the Meuse the region is very fertile, affording excellent pasturage for large herds of cattle, but the rest of the country is sterile, the soil being either marshy or sandy. Brewing and distilling are the principal branches of industry pursued here. Dutch Limburg comprises an area of 850 sq. m., with (1907) 327,714 inhabitants, of whom nine tenths were Roman Catholics; principal towns, Maastricht and Roermond. Belgium Limburg, which contains some iron and coal mines, comprises an area of 931 sq. m., with (1900) 240,796 inhabitants; principal towns, Hasselt, St. Trond, and Tongres.

Limburg (līm'borkh), town of Hesse-Nassau, Prussia; 16 m. NE. of Ems. The superb cathedral of St. George, picturesquely situated, with seven towers, exhibiting the latest Byzantine architecture in its mixture with the earliest pointed Gothic, is one of the finest in Germany. Limburg had considerable importance in the Middle Ages. It was one of the chief towns of the former duchy of Nassau. Pop. (1900) 8,465.

Lim'bus. See **LIMBO**.

Lime, fruit of *Citrus acidula* and *C. limetta* (the last called sweet lime), both probably mere varieties of *C. medica*, the citron tree. The lime grows on a dwarfish tree or shrub, and is a native of Asia, but is cultivated in nearly all warm regions. The limes of the W. Indies and those mostly known in the markets of the U. S. are the sour limes—the *C. acidula* of many botanists. Lime juice is extensively employed in ships' stores as an antiscorbutic. Citric acid is made from it. Lime is the usual English name of the linden tree (genus *Tilia*).

Lime, one of the alkaline earths, chemically the protoxide of calcium, symbol CaO . It forms the base of limestones, marbles, corals, and the shells of mollusks, where it is in combination with carbonic acid, forming the carbonate of lime. By the application of heat the

carbonic acid is driven off, and the lime is left in the condition of "caustic" or "quick" lime. Lime is usually white, light gray, or cream colored, porous, and soft. It rapidly absorbs water, uniting with it chemically, with the evolution of much heat. This process is called slaking, or slacking. Pure or "fat" limes when slaked swell very much, and ultimately fall into a snow-white powder. If more water is added, what is called the "milk of lime" is formed. The lime is now in the condition of a hydrate, and if exposed to the action of the air it absorbs carbonic acid, and is again converted into the carbonate of lime. In the preparation of mortar, sand is added according to the richness or "fatness" of the lime—that is, according to the fineness and uniformity of the powder into which it falls when slaked. Where the powder is very fine it makes with water a fluid paste which will penetrate the interstices between the grains of sand, however closely they may be crowded. The thinner the film of paste between the grains of sand, the stronger their adhesion will be. Hence the value of a lime is roughly measured by the quantity of sand it will serve to unite. Lime is largely used in agriculture as a dressing on soils, in making bleaching powder (chloride of lime), in tanning, to remove the hair from hides, as a flux in smelting iron, etc. Lime is extremely infusible, and cylinders of this substance are used in the oxyhydrogen or calcium light, a jet of the ignited gases being thrown upon a piece of lime, which when intensely heated emits a light so bright as to be almost unbearable to the eye. Limewater is made by dissolving a little pure lime in water.

Lime Light. See **DRUMMOND LIGHT**.

Lim'erick, city of Ireland, capital of the county of Limerick, province of Munster, on both sides of the Shannon, here crossed by five bridges and lined with docks. On the W. bank of the river stands Irish Town, on the E., Newtown Pery, and on an island in the river, English Town; but the first and the last parts of the city are occupied by the poorer classes, and consist mostly of mean houses. All the principal buildings, streets, and squares are in Newtown Pery. The city has distilleries, tanneries, flour mills, flax-spinning and weaving factories, and lace manufactures. It was taken, 1651, by Gen. Ireton, and was the last place in Ireland which surrendered to William III, on which occasion a treaty was signed (1691) granting certain rights to Roman Catholics. Its prosperity dates mainly from the founding of Newtown Pery, 1769, by Sexton Pery. Pop. (1901) 38,151.

Lime'stone, sedimentary rock composed chiefly of the carbonate of lime, the calcareous deposit of the sea wherever the mechanical sediments—sand and clay, the wash of the land—do not reach. The lime of limestones is for the most part derived from the hard parts of marine organisms, the shells of foraminifera and mollusks, the skeletons of polyps (corals), etc. By the formation of limestone, carbonic acid is drawn from the atmosphere, and fixed beyond the reach of all natural agents except heat sufficient to calcine the limestone. As the

causes which produce the ordinary metamorphism of rocks, converting limestones into marbles, though rendering them more crystalline and often discharging all organic colors and leaving them pure white, do not drive off the carbonic acid, it may be supposed that the carbonic acid which is absorbed in the formation of limestone is, for the most part, permanently withdrawn from the atmosphere. See **BIRD'S-EYE LIMESTONE**.

Lime Tree. See **BASS**.

Lim'ited Liabil'ity, peculiar responsibility for contracts, defined by statute. It has been customary in recent times to provide by statutes for the formation of partnerships with a limited liability on the part of some of the partners instead of the general liability of all the members for all the joint debts. These limited partnerships have everywhere the same general features. There are general partners and special partners. They enter into a contract of partnership in writing. In giving public notice of the arrangement the names of all are given, and the amount of the capital put in by the special partner is named, and this capital alone is put at risk by him in the business. The notice is required to be published, and generally to be recorded in some public office. A failure to comply with the statute in any substantial particular leaves all liable as general partners. Many statutes have been passed for the regulation and control of joint-stock companies with limited liability. The leading idea is that they must apprise the public of the nature of their association, so that no one need be deceived. The companies assume a joint name, after which is added the word "limited," and their books are required to be open for public inspection. Observing the statutory precaution, the members are only liable for company debts to the extent of the amount invested, or to the extent specified in their articles. The shareholders in the national banks of the U. S. are liable for twice the amount subscribed—that is, on paid-up stock for the amount paid in, and as much more when that is exhausted. This provision is very generally adopted with respect to banking and insurance companies.

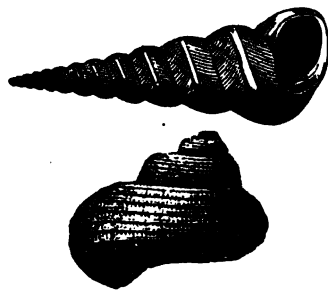
Limoges (lě-mōzh'), capital of the department of Haute-Vienne, France; on the Vienne River, 250 m. S. of Paris. It was here, 994, that the first attempt was made to establish the Truce of God. The noble Gothic cathedral was begun in the seventeenth century, and completed, 1851. The city has a famous breed of horses and extensive manufactures of porcelain. It has also cotton, paper, and woolen mills. Pop. (1906) 88,597.

Lim'omite, hydrated sesquioxide of iron, often called brown hematite, one of the commonest and most important ores of iron. The deposits of limonite are peculiarly local and irregular in character. They are never found forming continuous strata, but are (1) either the superficial deposits of chalybeate waters, filling fissures or cavities or incrusting slopes or accumulating in rounded masses in sand, clay, or gravel; or (2) they are produced by the

oxidation, at and near the surface, of beds of the carbonate of iron or iron pyrites. From their mode of formation the deposits of limonite are less extensive and reliable than those of other ores of iron; but they have always constituted one of the great sources from which the supply of iron has been derived. In the U. S. valuable deposits of limonite are found in a great number of localities. They occur perhaps in the greatest abundance in a belt which extends along the flank of the Alleghanies from New England to Alabama. *Bog-iron ore* is a spongy and usually impure limonite which accumulates in marshes from the leaching of surrounding beds of sand, gravel, etc., containing iron. *Lake ore* is limonite which gathers at the bottom of lakes and ponds that receive the drainage of strata or soils containing iron. In some of the Swedish lakes and at Radnor Forges, Canada, this ore is dredged up periodically, the deposit being reproduced at intervals of one year or of several years.

Limousin (lě-mō-sān'), former province of central France, comprising the present departments of Corrèze, Creuse, Dordogne, and Vienne. Its capital was Limoges. It gave name to a mediæval dialect which prevailed through much of S. France, and had a considerable poetic and romantic literature. The Limousin horses are a celebrated breed, especially suitable for cavalry.

Lim'pet, name given to various gasteropoda in which the shell is low and the spiral obscure, and which adhere closely by the muscular foot to the rocks, etc., in the water. They bore out a shallow place on the rocks by means



LIMPETS.

of their tongues, which contain flinty particles, and they leave the place from time to time to feed on algæ, etc., and then return to their resting places. Strictly speaking, the term belongs to the members of the group *Docoglossa*, which contains the genera *Patella*, the common limpets of Europe, and *Acmæa*, the common limpets of the coast of the E. U. S.

Limpo'po Riv'er, second largest river in S. Africa; so called by natives along its middle course. It has several other names given by various tribes; is also called by the Boers the Crocodile River. It rises on the Transvaal plateau, near Pretoria, flows NW., NE., and SW., and reaches the Indian Ocean some distance above Delagoa Bay.

Lin'acre, or Lyn'aker, Thomas, abt. 1460-1524; English physician; b. Canterbury; became Prof. of Physics at Oxford; was an associate of Colet, Erasmus, and Lily in introducing into England a knowledge of Greek; studied theology, and, 1518, became a prebendary of York; founded the College of Physicians at London, 1518; was its president for life, and was physician to Henry VII and Henry VIII.

Lin'coln, Abraham, 1809-65; sixteenth President of the U. S.; b. in a cabin on Nolin Creek, 3 m. W. of Hodgenville, Laurie (then Hardin) Co., Ky.; son of Thomas and Nancy Hanks Lincoln. In 1816 the family removed to Indiana, settling on Little Pigeon Creek, within the present township of Carter, Spencer Co. After working as a farm laborer and as a clerk in a store at Gentryville, he made a trading voyage to New Orleans as "bowhand" on a flatboat, 1828. In 1830 the family removed to Illinois, and young Lincoln helped to clear a farm on the N. fork of Sangamon River, 10 m. W. of Decatur, and was for some time employed in splitting rails for fences. For several years he resided at New Salem, where he was successively a clerk, grocer, surveyor, and postmaster. Here he studied law, interested himself in politics after his return from the Black Hawk War, and became known as an effective "stump speaker." He was elected to the legislature as a "Henry Clay Whig," 1834, and was reelected 1836, 1838, 1840, after which he declined reelection. Admitted to the bar, 1837, he soon established himself at Springfield, became a successful pleader in the state, circuit, and district courts; married, 1842, Mary Todd, of a prominent family of Lexington, Ky. He was a candidate for elector on the Harrison and Clay tickets, 1840, 1844, and was elected to Congress, 1846. As Republican candidate for the U. S. Senate, 1858, he held a series of public discussions with Stephen A. Douglas, the Democratic candidate, which, though it resulted in the election of Douglas, brought Lincoln into national prominence.

He was unanimously indorsed for the Presidency by the Illinois Republican State Convention, 1860, and by the National Convention at Chicago, on a vigorous antislavery platform, with Hannibal Hamlin, of Maine, for Vice President. The Democratic Party, presenting two candidates, Douglas and Breckenridge, and the remnant of the "American" Party having put forward John Bell, of Tennessee, the Republican victory was an easy one, Lincoln being elected by a large plurality, comprehending nearly all the N. states, but none of the S. The secession of S. Carolina and the Gulf states was the immediate result, followed a few months later by that of the border slave states and the outbreak of the great Civil War.

He called to his Cabinet his principal rivals for the presidential nomination—Seward, Chase, Cameron, and Bates; secured the cooperation of the Union Democrats, headed by Douglas; called out 75,000 militia from the several states on the first tidings of the bombardment of Fort Sumter; proclaimed a block-

ade of the Southern ports; called an extra session of Congress, from which he obtained 400,000 men and \$400,000,000 for the war; placed McClellan at the head of the Federal army on Gen. Scott's resignation; appointed Edwin M. Stanton Secretary of War; and, September 22, 1862, issued a proclamation declaring the freedom of all slaves in the states and parts of states then "in rebellion against the U. S." from and after January 1, 1863.

On October 16, 1863, he called for 300,000 volunteers to replace those whose term of enlistment had expired; commissioned Ulysses S. Grant lieutenant general and commander in chief of the armies of the U. S., March 9, 1864; was reelected President in November of the same year by a large majority over Gen. McClellan, with Andrew Johnson, of Tennessee, as Vice President; visited the army before Richmond the same month, entered the capital of the Confederacy the day after its fall, and on the surrender of Gen. Robert E. Lee's army was actively engaged in devising generous plans for the reconstruction of the Union, when on the evening of Good Friday, April 14th, he was shot in the head in his box at Ford's Theater, Washington, by John Wilkes Booth, actor, and died early on the following morning.

Lincoln, Benjamin, 1733-1810; American military officer; b. Hingham, Mass.; was an active member of the provincial congresses of Massachusetts; 1776, became major general; and in June cleared Boston harbor of British vessels. In 1777 he was made major general in the Continental army. Being severely wounded, he was invalidated for nearly a year. He became commander of the Southern army, September, 1778; was engaged in protecting Charleston against the demonstrations of Prevost; and cooperated in the unsuccessful assault on Savannah, October, 1779. In the spring of 1780 he was besieged in Charleston by a British force under Sir Henry Clinton, and capitulated in May. He was Secretary of War, 1781-84; commanded the forces which quelled the Shays's rebellion in W. Massachusetts, 1787; was elected lieutenant governor of the state; was afterwards Collector of Boston for about twenty years.

Lincoln, Robert Todd, 1843- ; American lawyer; b. Springfield, Ill.; eldest son of Abraham Lincoln; entered Harvard Law School, which he soon left to enter the army, where he served till the end of the Civil War on the staff of Gen. Grant; finished his law studies after the war closed; was admitted to the Chicago bar; Secretary of War, 1881-85; minister to Great Britain, 1889-93; afterwards engaged in professional work in Chicago.

Lincoln, capital of Lincolnshire, England; on the Witham; 130 m. N. of London; is a parliamentary, county, and municipal borough; is an old city, the seat of a bishopric, with one of the finest cathedrals in England, built in the thirteenth century; a theological college, and a school of science; large foundries and manufactures of agricultural implements, and an extensive trade in flour and wool. The

famous bell Great Tom of Lincoln is hung in the central tower of the cathedral. Pop. municipal borough (1908) 53,672.

Lincoln, capital of the State of Nebraska and of Lancaster Co.; 55 m. SW. of Omaha; is one of the most flourishing cities of the Missouri Valley, and has an immense wholesale and distributing business in all lines of merchandise, lumber, coal, grain, and live stock; has large stock yards and important manufactures. The public buildings include the state capitol, state insane asylum, state penitentiary, U. S. Govt. Building, and Home for the Friendless. Among the educational institutions are the Univ. of Nebraska, Nebraska Wesleyan Univ., Cotner Univ. (Christian), Lincoln Normal Univ., Union College, Worthington Military Academy, Nebraska Conservatory of Music, Roman Catholic convent, several parochial schools, and five libraries. Pop. (1910) 43,973.

Lind, Jenny, 1821-87; Swedish singer; b. Stockholm; acted and sang in children's parts until she was twelve years of age, when her voice failed her; after its return, four years later, appeared as *Alice* in "Robert le Diable" with brilliant success. She soon became the operatic star of Stockholm, was known as "the Swedish Nightingale," and sang in the chief cities of Sweden and Norway. In 1845 she appeared in Berlin and Vienna, repeating her triumphs in "Norma," "The Count of Silesia," and "The Daughter of the Regiment." Her first appearance in London was 1847. In 1848 she sang for the first time in oratorio, "Elijah," at Exeter Hall. In 1850-51, under contract with P. T. Barnum, she gave ninety-five concerts in the U. S. She married Otto Goldschmidt, 1852, and, after living in Sweden, took up her residence in England, appearing only occasionally in public, and then for charitable purposes only. Her voice was a light soprano of remarkable sweetness, flexibility, and charm of expression.

Lindau (lin'dow), Paul, 1839- ; German author and critic; b. Magdeburg, Prussia; founded *Das Neue Blatt*, 1869; *Die Gegenwart*, 1872; *Nord und Süd*, a monthly, 1878. His works include critical essays on Molière, Beaumarchais, and Alfred de Musset; several dramas, "Marion," "Maria and Magdalena," "Diana," etc.; and novel sketches of Venice, Paris, and other cities.

Linde (lin'dé), Samuel Gottlob von, 1771-1847; Polish philologist; b. Thorn; was rector of the gymnasium and librarian of the Univ. of Warsaw; best known for his great "Dictionary of the Polish Language"; also wrote "Historical Outline of the Literature of the Slavonic Races."

Lin'den. See BASS.

Lindisfarne'. See HOLY ISLAND.

Lindley, John, 1799-1865; English botanist; b. Catton, Norfolk; became, 1829, Prof. of Botany in University College, London; appointed, 1860, examiner in botany in London Univ.; edited *The Gardener's Chronicle*, 1841-65; wrote "Introduction to the Natural System,"

"Structure and Physiology of Plants," "Fossil Flora" (with Hutton), "Orchidaceous Plants," "Folia Orchidacea."

Lindpaintner (lint'pint-nër), Peter Joseph von, 1791-1856; German composer; b. Coblenz; was for years leader of the orchestra of Stuttgart, and made it one of the best in Germany; best-known operas, "The Sicilian Vespers" and "The Vampire."

Line, geometrical, magnitude which has length, but neither breadth nor thickness. We may regard a line as the path of a moving point, in which case the nature of the line will depend on the law of motion of the point. Two positions of the generating point are said to be consecutive when the distance between them is infinitesimal, and the corresponding portion of the line is called an element. We may suppose the point to move so that the elements shall be equal, or so that the projections of these elements on a given straight line shall be equal; the former is the method of plane geometry, and the latter is the method of analytical geometry and of the calculus. Lines may be either straight or curved. A straight line is a line whose elements all lie in the same direction—that is, it is a line whose direction is the same throughout; a curved line is one in which no two consecutive elements lie in the same direction.

LINE, in music, a horizontal mark used not only in the formation of the staff and its extension by ledger lines, but also for several other purposes. In a figured bass a long, unbroken line after a figure signifies the continuation or holding of the note indicated by the figure, while broken or short lines imply repeated strokes of a note, or sometimes the repetition of the same figure over the several notes of a moving bass. In modern music for the organ, curved or straight perpendicular lines, with arrow heads, are often used to mark the exact place where a change is to be made from loud to soft, or the reverse, or from one stop or set of keys to another. Two diverging or converging lines over a series of notes imply an increase or decrease of loudness, as otherwise expressed by the words *crescendo* or *diminuendo*, or their abbreviations, *ores.* and *dim.*

Lin'en, one of the earliest of textile manufactures, the origin of which is lost in the clouds of history. Pieces are still in existence which were woven 4,000 years ago. The term linen is a generic name for cloths woven from the fibers of the flax plant and hemp. The raw material of linen proper is the flax plant. Cloth made from the hemp plant was worn by the Thracians. The use of hemp in the linen manufacture is smaller now than formerly. Jute may also be commercially considered as a sort of linen, as it affords a cheap substitute for flax, the cultivation of which has not kept pace with the requirements of the makers. Of other substitutes which have been employed with varying degrees of success the nettle, china grass, reha, New Zealand flax, and Manila hemp may be named. The garments of the Hebrew priests were chiefly of linen, and

in the Bible there are many allusions which show the esteem in which this fabric was held.

It was not until the machine process of spinning and weaving cotton had been for some time in successful operation that similar improvements were applied to the manufacture of linen. The spinning wheel and hand loom were employed throughout the linen districts of Europe even into the nineteenth century. In the quality of the fabrics the highest excellence was attained by the French and Flemings, and among commercial products the linen of Flanders and the N. of Europe long maintained a high rank. The first mills in England for spinning flax were erected in Darlington near the close of the eighteenth century. Other mills were soon established, and the British manufacture became more extensive than that of other nations. It attained the greatest prosperity in Ireland, where the climate is best adapted for successful bleaching of linen, a process much more difficult and tedious than that of bleaching cotton, conducted very much in the open air, and dependent in great measure upon the condition of the atmosphere. The machine processes of weaving and spinning are not very different from those for cotton.

The countries in which the manufacture of linen is most extensively carried on are France, Belgium, Austria, Germany, and the British Isles. The principal seats of the manufacture in the latter are in and near the W. Riding of Yorkshire, in Lancashire, Dorsetshire, Durham, and Shropshire, in Dundee and other places in Scotland, and Belfast in Ireland. The towns of Dunfermline and Kirkcaldy and the whole county of Fife, in Scotland, are the greatest centers of damask or Jacquard weaving in the world. The manufacture of linen was introduced into the U. S. by the establishment of a large mill, 1834, at Fall River, Mass.; but the industry has not increased to a great extent for many reasons, such as climate, unprofitable returns for very hard work in the preparation by the farmer of the flax fiber for market, and the difficulty of grass bleaching under a scorching sun. At present the flax is raised for the seed only.

Ling, Peter Henrik, 1776-1839; Swedish poet; b. Ljunga, Smaland; became, 1814, director of the newly erected gymnastic institute of Stockholm, and, 1825, received the title of professor, developed the simple gymnastic practices into a medical cure—the so-called movement cure; works include the allegorical poem "Gylfe," the epos "Asarne," and the dramas "Agne," "Den Naliga Birgitta," and "Engelbrecht Engelbrechtson."

Ling, sea fish of the cod family (*Molva molva*), extensively caught in Europe. It is eaten fresh, or salted and dried. The name is also applied to the burbot (*Lota lota*), a freshwater fish of the cod family found in the rivers of all N. regions.

Lingard, John, 1771-1851; English historian; b. Winchester; was ordained a Roman Catholic priest, 1795; was afterwards connected with the seminary at Ushaw, near Durham; was, 1811-51, parish priest of Hornby, Lancashire; declined a cardinal's hat soon after

the publication of his great work, "History of England"; also author of a "History and Antiquities of the Anglo-Saxon Church" and an English version of the New Testament.

Lingayen (lên-gă-yên'), gulf on the W. coast of Luzon, Philippine Islands; 30 m. long and about 20 m. broad at mouth; contains Santiago and Cabarruyan Islands; receives the Agno Grande River. Also a pueblo and capital of province of Pangasinan, Luzon; on gulf of same name; 92 m. NNW. of Manila; 8 m. W. of Dagupan; is a trading point of considerable importance.

Linlithgow (lîn-lîth'gô), town of Scotland; capital of county of same name; on Linlithgow Loch; 17 m. W. by N. of Edinburgh; contains the ruins of a splendid palace founded by Edward I of England. There is also an ancient church founded by David I, and now considered one of the most perfect specimens of Gothic architecture in Scotland. Pop. (1901) 4,279.

Linnæa, genus of plants containing but a single species, *Linnæa borealis*, the twin flower, of the honeysuckle family, found by Linnæus in Lapland, 1732. It is a small, trailing, evergreen herb, with round leaves occurring in pairs, as do also the flowers, which are bell-shaped, of a pinkish color, and very fragrant. It abounds in the N. regions of Europe, Asia, and in N. America occurs as far S. as Maryland and as far W. as Colorado and California.

Linnæus (lîn-nē'ûs), Latinized name of CARL VON LINNÉ, 1707-78; Swedish botanist; b. Rashult, Smaland; son of a Lutheran vicar; went to Upsala, 1728, attracted by the fame of Rudbeck, professor of botany, but suffered much from hunger and cold, and, being without money or friends, began to despair, when Olaf Celsius, professor of divinity, met him by accident, gave him congenial employment on his "Hierobotanicon," took him into his own house, and introduced him to Rudbeck, whose assistant he became. In 1732 he explored Lapland under the patronage of the Academy of Sciences, and gathered material for his "Flora Lapponica," 1737. In 1735 he took the degree of M.D. at Harderwyk, in the Low Countries; resided at Hartecamp, 1735-38, under the patronage of George Clifort, a banker, of Amsterdam; published his "Systema Naturæ," "Fundamenta Botanica," "Bibliotheca Botanica," "Critica Botanica," "Hortus Cliffortianus," "Genera Plantarum," "Classes Plantarum"; returned, 1738, to Sweden; was appointed, 1739, physician to the king and Prof. of Botany at Stockholm; became, 1740, Prof. of Medicine at Upsala, and was Prof. of Botany there 1741-78, giving the university a world-wide fame and attracting thither large numbers of students from foreign lands; was ennobled in 1757. Besides the works above mentioned, his principal writings are "Philosophia Botanica," "Fauna Suecica," and "Flora Suecica," works on materia medica, and, above all, the "Species Plantarum," with which began the botanical nomenclature of both genera and species. His system of plant

classification, though now discarded, was simple and easily followed, and greatly promoted the study of botany in its day.

Lin'net, name given to various birds of the family *Fringillidae* (finches), but proper to those of the genus *Linota*, of which *L. cannabina*, the common European linnet, is the typ-



LESSER RED-POLL LINNET (*Ergothus linarius*).

1. Male. 2. Female.

ical species. These birds are remarkable for the changes in their plumage during the breeding season. N. America has several birds allied to the European linnet and similar in food and habits.

Lino'leum. See OILCLOTH.

Lin'otype Machine'. See TYPESETTING MACHINES.

Lin'seed Oil, oil of flaxseed; extensively used for all kinds of painting, for making oilcloths, oil silks, printer's ink, etc., its manufacture being a most important industry, and the parent of many others. The oil mills not only consume the greater part of the seed raised in the U. S., but large quantities are imported, especially from the E. Indies. The seed is crushed and submitted to great hydraulic pressure, by which the oil is for the most part removed.

Lin'ton, Eliza Lynn, 1822-98; English author; wife of William J. Linton; b. Keswick, Cumberland; published the novels, "Azeth, the Egyptian"; "Aymone, a Romance of the Days of Pericles," and "Realities," a romance of modern life. Later she was connected with the press especially *The Saturday Review*, in which her papers on "The Girl of the Period" attracted great attention. Among other novels are "Sowing the Wind," "Patricia Kemball," "The Rebel of the Family."

Linton, William, abt. 1790-1876; English landscape painter; b. Liverpool; traveled extensively, but made his home chiefly in London; works include "The Embarkation of the Greeks for Troy," "A Greek City, with the Return of a Victorious Armament"; "The Lake of Lugano," "Corinth," "The Bay of Naples," "Jerusalem at the Time of the Crucifixion," "Athens," "Temple of Minerva at Rome," "Venice," and "The Tiber."

Li'nun, genus of plants of which the common flax (q.v.) is the most important. It includes several flax plants not cultivated for fiber, but sometimes grown in gardens for ornamental purposes.

Li'nus, according to tradition, the first Bishop of Rome after St. Peter, but it is doubtful whether he succeeded the apostle, or whether St. Peter consecrated him bishop, perhaps long before his own martyrdom. The dates of his life are uncertain, some giving the year of his death as 80, others as 78 or 67.

Linus, a personage in Greek mythology of uncertain antecedents. (1) In Argos he was a son of Apollo by the Princess Psamathe. To escape detection Psamathe exposed the child, who was reared by shepherds, but when growing into manhood was torn to pieces by his own dogs. (2) In Thebes Linus was the son of Apollo and the muse Urania; he was killed by Apollo on Mt. Helicon, because he dared to dispute Apollo's supremacy in music. It is conceded now that the word Linus did not refer to an individual person, but was the name applied to the dirges that were sung throughout Asia in commemoration of the premature death of the husband-son (Tammuz, Hadad-Rimmon, Sandan, Atys, Adonis, etc.) of the great Asiatic mother-goddess, known to the Greeks as Cybele, Rhea, etc. Some think that Linus was the personification of a flower like Narcissus and Hyacinthus.

Linyan'ti, native town on the Chobe tributary of the Zambesi River, Africa, containing, when Livingstone visited it (1851), abt. 15,000 people, and then the chief center of trade in S. central Africa. This fact drew to it a party of missionaries, men, women, and children, nearly all of whom fell victims to the pestilential climate.

Linz (Lints), town of Austria; capital of province of Upper Austria; at the confluence of the Traun and Danube; 93 m. W. of Vienna; was formerly fortified; has two cathedrals, one dating from 1670; theological seminary, and manufactures of cloth, carpets, silk, leather, gold lace, paper, and tobacco. By the treaty concluded here December 13, 1845, religious liberty was granted by the Emperor Ferdinand to Hungary. Pop. (1900) 58,791.

Li'on, next to the tiger the largest and most powerful of the *Felidae*, or cat family, a full-grown male being a little over 10 ft. long from tip of nose to tip of tail. The female is smaller. The scientific name is *Felis leo*. The color of the lion, which is nearly uniform over the body, varies from pale yellowish gray to almost chestnut brown. The young are born spotted, and remain so for some time. The tail is tufted, and the male usually has a dark mane and dark fringes of hair along the flanks. The mane begins to grow when the animal is two or three years old, and attains its full development in about three years. The lion lives to about twenty-two years. Some males have no mane, and lions show great individual variation not only in this respect, but in size and color. Lions are not gregarious,

but parties of six or seven may be seen together, and while these are usually members of one family, yet several adults are now and then seen together. The lion is found over the greater portion of Africa, and in Mesopotamia, Persia, and parts of NW. Hindustan. In other parts of SW. Asia, as well as in portions of Africa, the lion has been exterminated. With-



AFRICAN LION.

in the historic period lions occurred in Asia Minor, and in the adjoining part of Europe as far as the Isthmus of Corinth. Except when pressed for food, the lion is rather lazy and indolent. He rests during the day and preys during the night. The testimony of the famous hunters who have written of the lion is that he is rather timid than courageous, and that he entertains great fear of man.

Lipari (lĭp'ā-rē), ancient *Æolīæ* or *Vulcaniæ insulæ*, group of volcanic islands in the Tyrrhenian Sea, from 12 to 40 m. from the N. coast of Sicily, belonging to the province of Messina; pop. (1901) 20,224; seventeen in number; principal ones, Lipari, Vulcano, Stromboli, Salina, Panaria, Felicudi, and Alicudi; are all mountainous; Stromboli has an active volcano; principal products, fruits, wine, cotton, corn, peas, and beans. Lipari, the largest, is about 18 m. in circuit; supplies Europe with pumice stone, of which its surface is almost wholly composed; capital of the group, of the same name, is on the E. coast of Lipari Island, 38 m. NW. of Messina; has a fortress, chiefly built by Charles V. Pop. (1901) 4,750.

Lippe (lĭp'pē), or **Lippe Detmold** (dēt'mōlt), small principality of Germany, between Hanover, Brunswick, and Westphalia; area, 469 sq. m.; pop. (1905) 145,577; chief town, Detmold; is hilly, but very fertile, well wooded, and watered by the Werre, an affluent of the Weser. The S. part is covered by the Teutoburger Wald, famous as the place where Arminius destroyed the Roman legions under Varus.

Lippi (lĭp'pē), **Filippo**, called **FRA LIPPO LIPPI**, abt. 1412-69; Italian painter; b. Florence; was a monk in a Carmelite monastery throughout his youth; was made chaplain of a convent, 1452, and later rector of a church in Legraia, in Tuscany. His most important

remaining works are frescoes in the Cathedral of Prato, behind the principal altar—the "History of St. Stephen" on one side, the "Life of John the Baptist" on the other. In the Academy of Florence is a large "Coronation of the Virgin," with many curious episodes introduced, and a portrait of the artist; also a "Nativity." The "Vision of St. Bernard," a very fine "Annunciation," and three other pictures are in the National Gallery of London.

Lippi, Filippo, the younger, called **FILIPPINO LIPPI**, d. abt. 1504; Italian painter; b. Prato; was a pupil of Fra Filippo Lippi; probably was adopted by him; and is said by Vasari to have been his son. His most important existing work is the series of frescoes in the Brancacci Chapel in the Church of the Carmine, at Florence; and, soon after, those in the Strozzi Chapel in the Church of Santa Maria Novella. These were painted between 1482 and 1490. In the Church of the Badia, at Florence, is the famous "Vision of St. Bernard," often engraved. In the Munich Pinakothek is a noble picture, "Christ Appearing to the Virgin" after the crucifixion. In the National Gallery are a "Virgin and Child with St. Jerome and St. Dominick."

Lip'sius, Justus (JOEST LIPS), 1547-1606; Flemish classical scholar; b. Oerrijsche, near Brussels; became Prof. of Eloquence at Jena, 1572, after renouncing the Roman Catholic faith; at Louvain, 1576; at Leyden, 1579; resigned his position on again returning to Catholicism, taking the chair of History at Louvain, 1592. His edition of Tacitus is one of the immortal masterpieces in the field of classical philology. It was published for the first time, 1574, and repeatedly reëdited thereafter. Of his other works the best known are his editions of Velleius, Valerius Maximus, and Seneca.

Liquefaction of Gases, conversion of gases into the liquid form. Since the boiling point of all liquids is raised by pressure, and since gases are to be considered simply as vapors existing at temperatures and pressures such that they are more or less remote from their boiling point, it follows that by the application of pressure, accompanied by reduction of temperature, the liquefaction of gases may be accomplished. Faraday, Natterer, and others made experiments with the so-called permanent gases, but the critical temperature of the gases lay below the range attainable by the use of the cooling mixtures at their command. In 1878 it was announced that Cailletet, of Paris, and Pictet, of Geneva, had both succeeded in liquefying oxygen. Subsequent development of their processes, with the introduction of a new cooling substance, ethylene, made it possible to liquefy both oxygen and nitrogen in large quantities. Carbon monoxide and marsh gas also yielded to these methods, and in 1898 Prof. Dewar, of the Royal Institution, London, succeeded in liquefying hydrogen.

Liqueur (lĭ-kēr'), strong alcoholic drink; usually founded on distilled spirit, and very rich and sweet. This is the most common use of the term, and such liqueurs are very numerous

and of varied flavor. Bitters are sometimes classed as liqueurs. Some distilled spirits not sweet nor highly aromatic are called by this name, especially when unfamiliar, such as kirschwasser and vodka; of these the best known is absinthe. Liqueur wines, called also dessert wines, are those which are very sweet and rich, such as Cyprus wine of the kinds usually brought to Europe. Of the distilled liqueurs some of old date have kept their favor, such as Maraschino, and especially Chartreuse and Curaçao. A number of popular liqueurs are made in certain great monastic establishments in Europe. Of these Chartreuse and Bénédictine are the best known.

Liquid, a substance which, as distinguished from a solid, is characterized by lack of stability of form and by greater freedom of motion between molecules, and, as distinguished from a gas, is characterized by stability of volume and by less freedom of motion between the ultimate particles. A liquid may be defined as matter existing in the state between the melting point and boiling point. Although the liquid state is common to all forms of matter, no gases being known which cannot be condensed by proper application of pressure and adequate reduction of temperature, and but few solids (such as carbon) which have not been rendered fluid by the application of heat, only two of the chemical elements, mercury and bromine, are liquids at ordinary temperatures and pressures. *Temperature* and *pressure* are the two factors which determine the maintenance of the liquid state, and one of these being constant, changes of the other will in general suffice to condense a gas or volatilize a liquid. There is, however, a critical temperature for each substance above which no increase of pressure will bring about liquefaction. The critical temperature has been determined only for a few substances.

The temperature at which liquids go over into gaseous form by ebullition varies with the pressure. The law of this variation has been worked out experimentally by Regnault and others. Melting points of solids are to a much less degree subject to change with pressure. The effect, however, is not altogether inappreciable, and it obeys the following law, *viz.*: substances the density of which increases by fusion have their melting point lowered by pressure and *vice versa*. Water and iron belong to the former class. Sulphur, phosphorus, and, indeed, nearly all substances as yet investigated, are of the latter class. While in the case of water the change is small, 120.8 atmospheres being necessary to lower the melting point one degree centigrade, it is very marked in the case of many substances of the second class.

Liquids are frequently spoken of as the incompressible fluids. They are, however, capable of measurable compression. They possess, in fact, less resilience of volume than many solids. The case of sea water is of special interest on account of the influence of its compressibility upon the ocean level. Tait computed the loss of volume due to the compression of each layer of ocean water by the su-

perincumbent mass, and found the level of the sea, to be more than 600 ft. below that which would exist in the case of a strictly incompressible fluid.

Liquid Air. Air was first liquefied in 1878, when Cailletet, in Paris, and Pictet, in Geneva, by means of a combination of pressure and cooling, succeeded in converting both oxygen and nitrogen into liquid form. In order to cool the gases of which air is composed to temperatures below their critical temperatures (that is, the temperature fixed for a gas above which it is believed that no amount of pressure will liquefy it, and is -105° C. for oxygen and -123° C. for nitrogen) it was necessary to increase the cold produced by the liquid ethylene or the carbon dioxide, which were the cooling agents used, respectively, by Cailletet and Pictet, by allowing the compressed gas to cool by its own expansion. The principle of the early processes for the liquefaction of air and other gases may be said briefly to consist in bringing gases to a high pressure, as of 100 to 300 atmospheres, in a vessel surrounded by a liquid cooling agent, which is reduced to the lowest possible temperature by being compelled to boil in a vacuum—that is, a closed space freed from air—and in suddenly releasing the compressed gas thus cooled from pressure. This third operation suffices to lower the temperature of the gas under treatment beyond the critical point, with the result of liquefying a portion of the gas. See **AIR**.

The scientific uses of liquid air are numerous. By the use of it as a cooling agent it has been found possible to reduce the last of the so-called permanent gases, namely, hydrogen and helium, to the liquid, and even to the solid, form, and likewise to study the physical properties of matter at temperatures below -250° C. When apparatus for the production of liquid hydrogen shall have been developed so as to permit the making of large quantities of this substance, it is probable that the range of temperatures will be extended downward by the process of boiling this element in a vacuum to temperatures extremely near absolute zero, which is somewhere about -273° C. below the Centigrade zero. Many industrial uses for liquid air have been suggested, among which are its use as a high explosive, as a substitute for compressed air in the driving of air engines, and as an ordinary cooling material to take the place of those produced by the refrigerating machinery in which ammonia and other vapors are used at the present day.

Liquidambar. See **GUM-TREE**.

Liquid Diffusion. See **DIFFUSION**.

Liquorice (lik'er-is). See **LICORICE**.

Liquor Laws, general term designating the laws passed by a state or government regulating the use and sale of intoxicating liquors, and fixing the rights of individuals directly or indirectly injured by their illegal sale. In Great Britain liquor legislation practically begins with the Act 9, George IV, which with modifications has been extended down to the

present time; but legislation on this subject is more advanced in the U. S. and the British colonies than it is in Great Britain. Sunday closing is only partially required in Great Britain, but is very general in the U. S. and in the British colonies; and the principle of local option, which is recognized in many of the colonies and largely in the U. S., and that of prohibition, which has gained considerable foothold in some parts of the U. S., are practically not recognized in Great Britain. In Great Britain the principal act regulating the subject at present is that introduced, 1872, by Henry Austin Bruce, afterwards Lord Aberdare, but this act does not apply to Scotland, and applies to a part only of Ireland. In Scotland the matter of licensing the sale of liquors is in general regulated by the Home Drummond Act of 1828. In Ireland the licensing laws are similar to those in England, with some modifications favoring keepers of public houses.

In the British colonies the liquor regulations are very diverse. In New Zealand licenses are granted by elective licensing committees, but new licenses can be granted only after a poll of the ratepayers. In Australia, Victoria recognizes the principle of local option, combined with compensation to heirs or relatives of a person who meets his death through the use of intoxicating liquors. In Queensland a majority of two thirds of the ratepayers have the power to prohibit the sale of liquor in any locality, and a majority can limit the number of licenses and prevent the issuing of new ones. In New S. Wales a form of local option exists. In S. Africa there are stringent regulations against the sale of intoxicants to the natives, but they are not well enforced. In India the sale of liquor to the natives is so great that the government has been accused of endeavoring to increase it for the purpose of adding to the revenue. In Canada a local-option law exists known as the Scott Act of 1878, under which a majority of voters in a locality can close all license permits without compensation.

In the U. S. some states have laws prohibiting the sale of liquor except as drugs, and others have what is known as the high-license system; local option also is very generally recognized. Throughout the larger part of the U. S., as well as Canada and the Australian colonies of Great Britain, it is provided by law that the relatives of a person who comes to his death through the use of intoxicating liquor may sue the liquor seller responsible for the drunkard's condition for damages; and it is also provided that the relatives of any intemperate person may notify the seller of liquor not to supply it to such person, and magistrates also may notify liquor sellers that drink cannot be sold to such a person except under penalty of the law. Some of these laws make the sale of intoxicating liquor to a habitual drunkard after such notification a misdemeanor, and in this case a sale after the notification of the wife of the drunkard or other relative having authority to give the notification is such negligence as enables the relative to maintain an action for damages for injuries to him resulting from such sale. In

the U. S. acts have been passed in a number of states providing for the instruction of children in the public schools in the subject of the physiological effects of alcohol and intoxicants; statutes have been passed in several prohibiting the employment of women where liquor is sold; and laws prohibiting the sale of liquors within a specified distance of school-houses or charitable institutions or churches are general in most parts of all the states.

The dispensary system of regulating the sale of liquor, based on the Gottheborg system of Sweden, was introduced into S. Carolina in 1892 and into N. Carolina in 1897. It provides by law for the establishment of dispensaries maintained by the state where liquor is sold under restrictions calculated to reduce the evils incident to its sale and use. Liquor dispensaries are operated by salaried officials, and one of the advantages of the system is the elimination of the saloon-bought vote. It is claimed that in N. Carolina in one year the consumption of liquor was reduced sixty per cent and drunkenness and crime fifty per cent, and that the dispensary yielded double the revenue that saloons had yielded under the license system. See PROHIBITION.

Lisbon, capital of Portugal and residence of its king; on the N. shore of a bay, Rada de Lisboa, formed by the Tagus at its influx into the Atlantic Ocean, and 9 m. from the mouth of the Tagus. The entrance to the harbor is defended by several forts, one of which is an old Moorish tower called Torre de Belem. The city, built on the declivities of seven hills, and of most charming aspect from the sea, is 10 m. in circuit and is divided into four quarters—Alhama, Rocio, Bairro Alto, and Alcantara, besides several extensive suburbs. There are sixty-four churches and about 200 chapels; the former monasteries, most magnificent buildings, are now used for public purposes. Among the many remarkable buildings are the Monastery of Belem, founded 1499; the Monastery of the Heart of Jesus, the Church of the Patriarchs, the Church of St. Vincent de Flora, the royal palace of Ajuda, the Royal Library, the Exchange, the custom house, the corn market, the theater of San Carlos, and the National Theater, formerly the Palace of the Inquisition.

The educational institutions include a Polytechnic School, Military and Naval School, Academy of Science, Geographical Academy, observatories, Museum of Natural History, and a conservatory of music. Gold and silver ware and jewelry are manufactured, and there are spinning and weaving establishments, iron foundries, and manufactures of silk, hats, boots, cutlery, stoneware, tobacco, chemicals, paper, soap, and steel. The commerce is extensive, Lisbon being the largest port in the kingdom; the average value of both annual imports and exports exceeds \$30,000,000. Lisbon as FELICITAS JULIA existed as a Roman *municipium*; later it was taken by the Goths and by the Moors. When, 1147, Alfonso I., at the head of the Crusaders, conquered and Christianized the city, it was called El-Oshbuna. In 1580 the Duke of Alva occupied it for Philip II of Spain; 1640, the Spaniards were expelled and the dynasty of Braganza ascended the throne.

On November 1, 1755, an earthquake destroyed the greater part of the city, but the place was soon rebuilt. Pop. (1900) 356,009.

Lisle (lël), Guillaume de, 1675-1726; French geographer; b. Paris; wholly reconstructed the prevailing system of geography by the publication of over 100 maps, and constructed a celestial and terrestrial globe; was tutor in geography to Louis XV, who created for him, 1718, the title of "first geographer to the king," with a pension.

Lisle, fortified city of France; capital of department of Le Nord; 7 m. from the Belgian frontier; 127 m. NNE. of Paris; is traversed by the Deule River and connected with the sea by canal. The fortifications are Vauban's masterpiece. Lisle has more than thirty public squares and as many bridges, and numerous educational institutions, including an art school with a remarkable collection of drawings by the old masters. It rivals the English manufacturing towns in the spinning of cotton, which occupies over thirty establishments. Flax is largely grown in the vicinity, and the linen manufacture is the most important industry. Lisle was founded in the ninth century, and fortified in the eleventh. After sharing the fortunes of Flanders, it was annexed to France by Louis XIV, 1667, and made the capital of French Flanders. In 1708 Prince Eugene and Marlborough took it despite the heroic defense of Marshal Bouffers. France recovered it by the peace of Utrecht, 1713. It was besieged, 1792, by the Austrians, who after a heavy bombardment were repulsed with great loss. It is the headquarters of the third military division, and is one of the strongest fortresses of Europe. In the World War the city was occupied by the Germans in August, 1914, and held by them till Oct. 5, 1918, being considered by them one of the strongest posts on the noted "Hindenburg line." The Allies took possession Oct. 17 following, and on the 28th the city held a grand celebration of its new freedom. Its resistance of the German invasion greatly aided the French forces. Pop. (1906) 205,602.

List, Friedrich, 1789-1846; German economist; b. Reutlingen, Württemberg; Prof. of Political Economy at the Univ. of Tübingen, 1817-19; was elected to the diet of Württemberg; imprisoned, 1822, 1824, for exposing the vices of administration. He settled in Pennsylvania on his release and became an extensive landholder; returned to Europe, 1833; was U. S. Consul at Hamburg and then at Leipzig; engaged in journalism in Paris, 1837-43; established in Augsburg, 1843, the *Zollvereinsblatt*. Author of "Outlines of a New System of Political Economy," "A National System of Political Economy," etc.

List'er, Sir Joseph (first Lord), 1827-1912; English surgeon; b. Upton, Essex; was educated in London; Prof. of Clinical Surgery in Glasgow, in Edinburgh, and in 1877 in King's College, London. His early investigations in physiology and pathology suggested the idea that putrefaction and other fermentative changes were caused by germs; from this idea the more important thought developed that the

bad results occurring in surgical operations were often due to germ or septic infection, and that if these operations should be performed with antiseptic precautions better results would be obtained. This principle has been gradually elaborated from the time of its announcement, in 1869, and it has revolutionized surgery and placed mankind under obligations to its originator. In 1878 Edinburgh Univ. conferred the degree of M.D. on him; in 1880 both Oxford and Cambridge conferred upon him the degree of LL.D.; in 1883 he was created a baronet, and in 1897 was raised to the peerage as Lord Kinnear. His Croonian lectures in 1863 were on the coagulation of blood; published his observations on the ligation of arteries on the antiseptic system, 1869; other publications are "Remarks on a Case of Compound Dislocation of the Ankle, with Other Injuries, Illustrating the Antiseptic System of Treatment," "On the Effects of the Antiseptic System of Treatment upon the Salubrity of a Surgical Hospital," "A Contribution to the Germ Theory of Putrefaction and Other Fermentative Changes."

List'on, John, 1776-1846; English actor; b. London; became one of the best comic actors in England during the first third of the nineteenth century. His reign at the Haymarket began 1805, at Drury Lane, 1823, and at the Olympic, 1831. He left the stage in 1837. His wife (Miss Tyrer), though of almost dwarfish stature, was a favorite actress as well as singer.

Liston, Robert, 1794-1847; Scottish surgeon; b. Ecclesmachan; practiced at Edinburgh, 1818-35; was lecturer on Anatomy and Surgery and surgeon to the Infirmary; became Prof. of Clinical Surgery at University College, London, 1835; surgeon to the N. London Hospital, 1843; examiner to the College of Surgeons, 1846. He wrote several able professional treatises, of which the most important were "Elements of Surgery" and "Practical Surgery."

Liszt (list), Franz, 1811-86; Hungarian pianist and composer; b. Raiding; son of an accountant or steward of Prince Esterhazy, a man of musical taste who held the boy severely to work; gave a concert at the age of nine; studied at Vienna with Czerny and Salieri; was taken to Paris, 1823, where he excited great enthusiasm; 1824-25, achieved triumphs in the provinces and in England. In 1827 he fell into a morbid state, became a Saint-Simonian, and, 1830, composed a "Symphonie révolutionnaire." The playing of Paganini revived his passion for art, he renewed his labors, and astonished Europe with his mastery of the piano and the ease with which he executed the most difficult works. In 1848 he was made Kapellmeister at Weimar. Honors came thick upon him, among them the office of chamberlain to the Grand Duke of Saxe-Weimar, the title of doctor of music, conferred by the faculty of Königsberg, the decoration of the Legion of Honor, 1845, followed by the rank of commander, 1861.

On April 25, 1865, Liszt received the clerical tonsure in the chapel of the Vatican with the

title of *abbé*, but belonged to the so-called secular clergy. One of his daughters by the Countess d'Agoult, the author known under the pen name of "Daniel Stern," became the wife of Richard Wagner. His works consist of *fantasias*, *poèmes symphoniques*, "Faust" and the "Divina Commedia," grand symphonies; two oratorios, "Die Heilige Elizabeth" and "Christus"; and transcriptions innumerable.

Lit'any, term originally used in a general sense to denote any sort of united prayer, whether public or private, whether penitential, intercessory, supplicatory, or deprecatory. It thus occurs in the writings of Eusebius and Chrysostom and in the laws of Arcadius. In course of time litany became, in the liturgical services of the Christian churches, a name applied to various supplicatory acts addressed to God or to the saints, or both, but applied especially to solemn prayers in which the people take responsive parts. The principal litany of the Roman Catholic Church is the Litany of the Saints; the Anglican churches have a service called the Litany and Suffrages; the Lutherans and some other Protestants have litanies.

Lith'arge. See **LEAD**.

Lith'ium, rare metal, the existence of which in the mineral petalite was discovered by Arfvedson in the laboratory of Berzelius, 1817. It occurs in *lepidolite*, *spodumene*, *amblygonite*, *triphylite*, some *tourmalines*, and other mineral species, and is a frequent constituent, in small proportions, of mineral waters. Lithium was first obtained by Bunsen by electrolysis of the fused chloride. It is a silver-white metal, somewhat softer than lead, and lighter than any other known solid body, having a density of only .5835; so that it floats even on petroleum and naphtha. It has also the smallest atomic weight of any element except hydrogen, this weight being only 7. The smallest traces of lithium are detectable by means of the spectroscope, which gives a spectrum consisting entirely of two lines—one a brilliant intense crimson, and the other a faint yellow. Lithium imparts to flame this beautiful crimson tint, and, were it cheap enough, would be a valuable agent in fireworks. An interesting practical application of the characteristic flame color of lithium has sometimes been made. In cases of suspicion that a well or cistern is being poisoned by percolation from a privy or drain, a little lithium may be put into the supposed source of contamination. In case of percolation it will soon be easily detectable with the spectroscope, with chemical certainty, in the water of the well.

Lithog'raphy, art of drawing on stone with a chemically prepared ink or crayon, or engraving on stone with a needle or diamond point and printing therefrom with lithographic ink. The invention of lithography is commonly ascribed to Alois Senefelder, who, 1796, first practiced the art in the printing of music in Munich, where he was an actor, although it is claimed that Simon Schmidt, in Germany, and William Blake, in England, both utilized the

same or a similar method for producing work as early as 1788. Among those who aided in the development of the art were Gottfried Engelmann, of Mulhouse, Alsace, and Paris; the Lemericiers, of Paris; Franz Hanfstängl, who reproduced many of the pictures in the Dresden Gallery; Ferdinand Piloty, of Munich; Carle Vernet, Eugène Delacroix, Julien, Nicholas Toussaint Charlet, Denis Raffet, and other Frenchmen.

The stone used in lithography is a closely grained limestone, found in different parts of Europe and America; the best stone, however, is found in Solenhofen, Bavaria, from which place almost the entire world receives its supply, although in later years quarries have been opened in Canada and in some of the S. and W. states, all of which promise good results. The stones, which are slabs from 3 to 4 in. in thickness, are ground to a uniform face and polished. The crayon or chalk, as it is sometimes called, is of a greasy composition, principally of wax, soap, tallow, shellac, turpentine, and lampblack, and being exceedingly brittle it is sharpened from the point upward. The ink used for drawing with the pen on the stone is composed of the same ingredients as the crayon, though containing a trifle more grease, and is rubbed dry on a plate or saucer, after which it is dissolved with water until it is sufficiently liquid to flow easily.

The stone when ready for the drawing is so sensitive to anything of a greasy nature that even to touch the surface with the fingers would smut it, and the places so touched would be liable to print almost the same as though they were a part of the drawing. After the stone has been grained or polished, the drawing is made thereon precisely as though it were being drawn on paper, though necessarily reversed. When the drawing is completed it is bathed with a solution of nitric acid and gum arabic, the object of which is to keep the grease of the crayon or ink from spreading, and at the same time to render those parts of the stone having no drawing on them more porous and more capable of absorbing moisture. After the acid and gum have been allowed to dry, the stone is first washed with water, and after this all indication of the drawing is washed off the stone with turpentine, leaving only the grease of the ink or crayon on the surface, which being again washed, this time with pure water, is now ready for printing. The stone having been moistened either with a wet sponge or damp roller (the moisture of course being repelled by the grease of the drawing), the printing roller, charged with ink, passes over the stone, the ink naturally adhering only to those places where the stone is dry, or, in other words, where the drawing is. A sheet of paper is then placed on the stone and run through the press. This process of dampening, rolling, and pulling through the press is necessary for each impression made, and while but from 200 to 500 impressions can be made per day on a hand press, from 5,000 to 8,000 can be made on a large power press.

Engraving on stone is done very much as engraving on steel or copper, but in printing the engraved lines are filled in with ink ap-

plied with a dabber in place of a roller. By the process of transferring, invented abt. 1860, it is possible to transfer any given number of smaller subjects (which at one time had to be printed singly from the original stones) on a large stone, and thereby it has been made possible to print forty or sixty or more subjects at one time. This method of transferring is done by making from the original stones or from plates as many impressions as are desired on specially prepared sensitive transfer paper, with an ink of the same general substance as the original lithographic ink or crayon, but of a semiliquid consistency; then, after having fastened these impressions side by side on a large sheet of paper or zinc, this is placed face downward on a clean and smoothly polished stone of requisite size, and pulled through the press with sufficient pressure to transfer the carefully made impressions from the transfer paper to the stone.

Colored or chromo lithographs, as they are more generally called, are often printed in as many as twelve or fifteen colors, which, when artistically handled, will produce twice or three times as many shades and tints, and it is not uncommon to use twenty or thirty colors to reproduce an especially fine water-color drawing or oil painting, in order to give in facsimile every shade and tint of the original, each color used requiring a separate stone. Multicolor printing, the printing in rapid succession of two or three, or even more, colors on every sheet, has been made possible by the introduction of a rotary press in which the plate cylinders, two or three in number, are substituted for the lithographic stone of the formerly used flat-bed press. This gives an increase of fifty per cent in speed of printing over former processes. In later years photography has been more or less applied to lithography, the result being not only the very common process of photolithography by which architectural and mechanical drawings, more especially, are accurately reproduced from pen drawings at a small expense, but also the exquisite effects produced in comparatively few printings by transferring negatives to stone through the medium of the "half-tone" or screen process. See APPLIED SCIENCE; THREE-COLOR PRINTING.

Lithot'omy, Lithot'ritry, and Lithol'apaxy, surgical operations for the extraction of stone from the bladder. The term *lithotomy* refers to the cutting operation by which an opening is made from the surface of the body into the cavity of the bladder where this organ lies nearest to the surface. Through the opening thus made the stone is seized and brought away. This operation has been in use since the earliest period in the history of surgical art. The term *lithotritry* refers to the older method of crushing and removing a stone at several operations or "sittings," and the term *litholapaxy* refers to the modern improvement by which it is completely removed at one time or by a single operation, including its crushing and the evacuation of the fragments.

Lithua'nia, in the Middle Ages an independent and powerful state, comprising those large

tracts of mostly low and level land which extend from the Baltic to the Black Sea, between the Niemen and the Duna in the N. and the Don and the Bug in the S. In the eleventh century the Lithuanians were tributary to the Russians, but in the twelfth they threw off the yoke. In 1320 Gedemin conquered Volhynia, Kiev, and Tchernigov from Russia. In 1386 Jagellon united Lithuania with Poland, having married Hedwig, a daughter of King Lewis of Poland and Hungary. By the division of the Polish kingdom one small part of Lithuania went to Prussia, forming the government of Gumbinnen, while the rest was incorporated with the Russian crown, forming the provinces of Vilna, Grodno, Moghilev, Vitebsk, and Minsk. The Lithuanians in race and language belong to the Lettic group. On the establishment by the Peace Conference of new boundaries and nations in Europe, the region bounded on the N. by Latvia, on the E. by Russia, and on the S. by Poland and a projection of E. Prussia, was apportioned to the new republic of Lithuania. See LETTIC RACE.

Lit'mus or Lac'mus, peculiar coloring matter, derived from certain lichens, chiefly *Roccella tinctoria*. There are three of these substances derived from plants, namely, litmus, orchil, and cudbear. Litmus for use in the arts, is prepared almost exclusively in Holland. It is largely used in determining the reaction of liquids.

Litre (lê'têr). See METRIC SYSTEM.

Lit'tle Colora'do Riv'er, or Colorado Chiquito (chê-kê'tô), tributary of the Colorado River of the West; rising in W. New Mexico and E. Arizona and flowing about 225 m. toward the W. and NW.; in places absorbed by the sands of its bed during the dry season; in middle course it traverses a broad, arid valley, but, approaching its mouth, it plunges into a deep gorge.

Little Hum'boldt Riv'er, most important tributary of the Humboldt in Nevada; joins the main stream above Winnemucca, and flows W. and then S. through Paradise Valley in Humboldt Co.

Little Kanawha (kâ-nâ'wâ) Riv'er, river which rises in Upshur Co., W. Va., and flows in a generally NW. course, joining the Ohio at Parkersburg; flows through the oil region, and has wide and fertile bottom lands. The building of dams has made it navigable 38 m. to Burning Springs.

Little Rock, capital of the State of Arkansas and of Pulaski Co.; on the Arkansas River; 125 m. SW. of Memphis; is built on the first highland reached by ascending the river, which is navigable eight months of the year for large steamboats, smaller ones plying to Fort Smith, on the border of Oklahoma, 300 m. above. It is both a commercial and a manufacturing city; has many large wholesale houses, and cottonseed-oil mills, cotton compresses, cotton mill, cotton-press factory, foundries and machine shops, granite quarries, chair and furniture factories, railway machine shops, gin factories, planing mills, ice factories, and flour, stove, and candy works. The

public buildings include the State Capitol, Penitentiary, State School for the Blind, State Insane Asylum, Deaf Mute Institute, U. S. Govt. building, U. S. arsenal, Children's Home, Old Ladies' Home, and Board of Trade building. The city is the seat of the Arkansas Industrial Univ., Little Rock Univ., Arkansas Law and Medical College, Arkansas Female College, Philander Smith College, St. John's Military College, Roman Catholic Academy and Convent, and other institutions. Little Rock was settled 1819, made capital of Arkansas Territory, 1820, and held by the Confederates during the greater part of the Civil War. Pop. (1910) 45,941.

Little Rus'sia, SW. Russia N. of the Black Sea provinces; extends in the middle Dnieper Valley from Kharkof to Galicia in the former Empire of Austria. The people differ widely in character from the other Russians, and their language and literature are peculiar. The Little Russian language is common E. to the Asiatic frontier, and is found W. in Bukovina and Hungary.

Little Tibet'. See **BALTI**.

Litt'leton, or **Lyt'telton**, **Sir Thomas**, 1402-81; English jurist; b. Frankley, Worcestershire; eldest son of Thomas Westcote, but baptized in name of his mother's family; was appointed successively steward of the king's household, judge of assize, and a judge of the Court of Common Pleas; best known by his treatise on "Tenures," which, with Coke's "Commentaries," long remained the principal authority on the English law of real property.

Litt'le Tur'tle (**ME-CHE-CUN-NA-QUA**), d. 1812; Miami Indian chief of great reputation for intelligence, shrewdness, and valor in warfare; is supposed to have received some education in Canada; commanded in the battles which resulted in the defeat of Gen. Harmar on the Miami, 1790, and of Gen. St. Clair at St. Mary's, 1791; was present, though not in command, at the battle of Fallen Timbers or Maumee Rapids, 1794, in which the Indians were defeated by Gen. Wayne; was one of the signers of the Treaty of Greenville, 1795, which ended the war and conveyed to the whites an extensive region in Ohio.

Littorale (**lit-tō-rā'la**), province of the former Austrian Empire, extending along the N. shore of the Adriatic from Venetia to Croatia; bounded N. and E. by Carinthia and Carnolia; consisted of the counties of Görz and Gradisca, the Margraviate of Istria, and the district of Trieste, and comprised an area of 3,085 sq. m. Pop. (1900) 755,546.

Littre (**lê-trâ'**), **Maximilien Paul Émile**, 1801-81; French philosopher; b. Paris; practiced medicine, but combined with this philosophical labors in many languages; published the first volume of a translation of Hippocrates, and was elected to the Académie des Inscriptions et Belles-Lettres; abt. 1840 became a leader of the Positivists. In 1867, with other Positivists, he founded the review *La Philosophie Positive*. He succeeded Fauriel, 1844, on the commission of the Academy charged with

the continuation of the great "Literary History of France"; in 1863 he presented to that body the first part of his remarkable "Dictionary of the French Language." He was elected by the city of Paris to the assembly, 1871, and was made life senator, 1875. In 1874 he was elected a member of the Académie Française. His works include "Applications of the Positive Philosophy to the Government of Societies," "Auguste Comte and the Positive Philosophy," "Literature and History," and many articles in the "Dictionary of Medicine."

Littrow (**lit'rō**), **Joseph Johann von**, 1781-1840; Austrian astronomer; b. Bischof-Teinitz, Bohemia; became Prof. of Astronomy at Cracow, 1807; removed, 1810, to Kazan, 1816 to Buda, and 1819 to Vienna, where he died. Under his direction the observatory of Vienna was much improved, and his lectures drew great audiences. Among his writings are "The Wonder of the Heavens," "Theoretical and Practical Astronomy."

Littrow, **Karl Ludwig**, 1811-77; Austrian astronomer; b. Kazan, Russia; son of the preceding; was his assistant in the Vienna Observatory from 1831; succeeded his father as director in 1842, and was employed in 1847 in connecting Austria and Russia by triangulation.

Lit'urgy, in a general sense, any prescribed form of public worship; in a more strictly ecclesiastical sense, that form which was peculiar to the first Christian congregation. Although there are many differences in the numerous Liturgies which have come down to us from former ages, yet there is a similarity between them which enables us to trace them all back to a few sources. There are five families: (1) That of St. James or Jerusalem; (2) of St. Mark or Alexandria; (3) of St. Thaddeus or the East; (4) of St. Peter or Rome; (5) of St. John or Ephesus; and these five families of Liturgy suggest by their common structure a common origin.

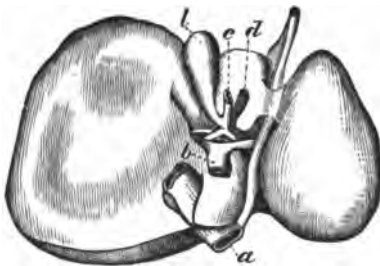
The Anglican churches have but one service book, of a complex nature, being at the same time breviary, missal, ritual, and pontifical; it is called "The Book of Common Prayer and Administration of the Sacraments and Other Rites and Ceremonies of the Church." (See **COMMON PRAYER, BOOK OF**.) This book contains first the choir offices compressed into two portions called "Daily Morning and Evening Prayer" and the Psalter divided, so that it is recited once each month. There is also the Litany to be said at certain times. The prayers for the seasons and holy days follow, and the "Order for the Administration of the Lord's Supper or Holy Communion," corresponding to the ordinary and canon of the mass. The forms for the administration of baptism, confirmation, and the "Communion of the Sick," for the "Solemnization of Holy Matrimony," and for the "Visitation of the Sick," and the burial office come next, and at the end of the book are the forms for the ordination of the bishops, priests, and deacons. Besides these, there are some special services of less note, and varying in different parts of the

world. Speaking accurately, the Book of Common Prayer cannot be said to be a distinct liturgy from that of Rome, but rather an adaptation, in which much of the W. service has been kept unchanged. The chief points in which the Book of Common Prayer used by the Protestant Episcopal Church in the U. S. varies from the English book are the restoration of the rest of the Canon of Consecration, the omission of the Athanasian Creed, and of the indicative form of absolution from the Office of the Visitation of the Sick, and the addition of A Form for the Visitation of Prisoners (which was taken from the Irish Prayer Book), of a service of "Thanksgiving for the Fruits of the Earth," and of a number of separate prayers and collects. The Forms for Ordination were added, 1792, the Form for the Consecration of a Church, 1799, the Book of Articles of Religion, 1801, and last of all an Office of Institution, 1808. The changes made by the General Convention of 1892 were principally the restoration of the "Magnificat" and of "Nunc dimittis" to evening prayer, the making of the recitation of the Nicene Creed obligatory in all churches, and the introduction of translations into English of three sets of propers from the unreformed service books.

Liu Kiu (lū kū'), or **Loo Choo Islands**. See **KIU KIU ISLANDS**.

Livadia (li-vā'dē-ā), town of Greece; in the nome of Attica and Boeotia; on the Hercyna; was the principal town of Greece under the Ottomans.

Liv'er, organ characterized by the presence of cells secreting bile, and found in some form or other in all animals. The liver in man occupies the right hypochondriac and epigastric regions, extending partly into the left hypochondrium, below the diaphragm; it is above the stomach, duodenum, arch of the colon, gall



THE LIVER VIEWED FROM BELOW.

a, vena cava; b, vena porta; c, bile duct; d, hepatic artery; e, gall bladder.

bladder, and right kidney, and in front of the aorta and lower vena cava. Its normal weight is about 5 lbs. It has an irregular form, being elongated transversely, flattened from above downward, very thick behind, and thin in front; its tissue is dense and reddish brown. The upper surface is convex, in contact with the diaphragm, and is directed upward and forward, while the under surface is irregularly concave and directed downward and backward. It is technically divided into five lobes, viz.,

the right and left lobes, the *lobus quadratus* or square lobe, the *lobus Spigelii*, and the *lobus caudatus* or tailed lobe. Only the right and left lobes are seen upon the upper surface, but all five are exposed on the under surface. The liver is in great part covered with a shining peritoneal or serous envelope; an investment of areolar tissue also is spread over the organ, extending into the interior, and forming thin but dense sheaths to the vessels and canals, called the capsule of Glisson.

The blood coming from the alimentary canal by the portal vein reaches the hepatic vein, and after passing through the capillary circulation of the liver, during which it undergoes important changes. There is a loss of fibrin, and also the formation of a kind of animal sugar, which is produced by the catalytic transformation of a peculiar substance termed "glycogen," also produced in the organ. There are also certain ingredients of the bile, such as cholesterin and the various mineral salts, already existing in the blood, which are separated from it by the action of the liver, and exuded, together with the watery parts of the secretion, into the biliary ducts, there to take part in the constitution of the bile. Other ingredients of the bile, and these the most important ones, such as the taurocholate and glycocholate of soda, which do not preexist in the blood, are formed by the liver itself.

Liv'ermore, Mary Ashton, 1821-1905; American reformer; b. Boston, Mass.; daughter of Timothy Rice and wife of Daniel P. Livermore, a Universalist minister; labored with much ability in behalf of the U. S. Sanitary Commission during the Civil War, and took a prominent position as a writer and public speaker on woman suffrage and various social and religious questions; she was editor of *The Woman's Journal* of Boston, Mass.; author of "Pen Pictures," "Thirty Years Too Late," a temperance story, and "My Story of the War: a Woman's Narrative of Four Years' Personal Experience as Nurse in the Union Army."

Liv'erpool, Charles Jenkinson (first Earl of), 1727-1808; British statesman; b. Oxfordshire; entered Parliament and was appointed Under Secretary of State, 1761; joint Secretary to the Treasury, 1763; a lord of the admiralty, 1766; was Secretary of War, 1778-82; president of the Board of Trade, 1784-1801; was popularly disliked on account of his supposed undue influence with the king; wrote several political works, including "Collections of All the Treaties of Peace, etc., Between Great Britain and Other Powers, from 1648 to 1783," with a "Discourse on the Conduct of Great Britain in Respect to Neutral Nations" and a "Treatise on the Coins of the Realm"; was created Lord Hawkesbury, 1786, and Earl of Liverpool, 1796.

Liverpool, Robert Banks Jenkinson (second Earl of), 1770-1828; British statesman; son of the preceding; b. London; entered Parliament, 1791; was appointed Secretary of State for Foreign Affairs in the Addington Cabinet, and negotiated the Treaty of Amiens, 1801; became Home Secretary under Pitt, and on the latter's

death, 1806, declined the premiership, but accepted it on the assassination of Mr. Perceval, 1812, and remained at the head of the administration until an attack of paralysis occasioned his resignation, 1827. To liberal opinions he was always steadfastly opposed, and his efforts, extending over a period of more than thirty years, greatly contributed to retard Catholic emancipation, parliamentary reform, the emancipation of the slaves in the W. India colonies, and other kindred measures. His policy was completely reversed by his successor.

Liverpool, city and port of Lancashire, England; on the estuary of the Mersey; 202 m. NW. of London; is a parliamentary and municipal borough, also for certain purposes a county in itself. Here the Mersey is 3 m. from the open sea; at its narrowest parts, between the landing stage and Birkenhead, on the opposite side, it is $\frac{3}{4}$ of a m. in width, but farther N. it widens considerably, and is navigable by vessels of the largest draught. A railway tunnel connects Liverpool and Birkenhead. Among the wonders of the world are the docks of Liverpool, some fifty in number, with their appurtenances, and it was here that the system of floating docks originated. The docks extend along the Liverpool shore of the river for more than 6 m. The water area is 381 acres, and 25 $\frac{1}{2}$ m. of quay space. The docks at Birkenhead, controlled by the corporation of Liverpool, extend for 1 m. along the shore and inland 2 m., occupying a water area of 164 $\frac{1}{2}$ acres and 9 $\frac{1}{2}$ m. of quay space, in all 545 $\frac{1}{2}$ acres of water area and 35 m. of quay. There are also twenty-three graving docks in which vessels are repaired. Among the public institutions are Liverpool Univ., forming part of the Victoria Univ., Manchester, with which is connected an important medical school; Liverpool College, in connection with the Church of England; Government School of Art, Nautical College, and St. Edward's Roman Catholic College for young men.

The commerce and shipping of Liverpool are larger than those of any other port in the United Kingdom. Its imports are less in value than those of London, but its exports are larger, and its exports and imports are more equally balanced. Its commerce with the U. S. is greater than with any other country. The total tonnage of all the vessels (exclusive of the coasting trade) which entered and cleared at Liverpool, 1907, was 15,425,288 tons. In addition to its general commerce with the U. S., Liverpool sends to them large numbers of emigrants, for which it is the chief port of embarkation. Besides its foreign commerce Liverpool has a large coasting trade. The city has some shipbuilding. The various processes connected with shipbuilding and shipfitting employ over 3,000 persons. There are also establishments for the construction of marine engines and of machinery generally. Although other industries are carried on, such as sugar refining, tobacco manufacturing, and watch and chronometer making, those connected with commerce, the docks, and navigation are the most important. Liverpool contained but a few thousand inhabitants, 1709, in which year a wet dock was erected. Its rapid growth in the

eighteenth century was due to its being the headquarters of the slave trade. When that was suppressed, the development of the Lancashire cotton manufacture gave the merchants a more legitimate channel for their energies, Liverpool importing from the U. S. the cotton needed for that industry. It was connected with Manchester by railway, 1830; was a city, 1880. Pop. of county borough (1901) 704,134; (1911) 746,566.



MARCHANTIA POLYMORPHA, SPECIES OF LIVERWORT.

1. Female plant. 2. Male plant with cupule. 3. Elater and spores.

Liverworts, popular name of certain green plants related to the mosses. They form one of the classes of mosses.

Livia Drusilla, 56 B.C.-29 A.D.; wife of the Emperor Augustus; was the daughter of Livius Drusus, and was married first to Tiberius Claudius Nero, who was compelled to divorce her in favor of the victorious triumvir. She had already borne her husband the future emperor Tiberius, and a few months after her second marriage she bore another son, Drusus. She always retained the affections of the emperor, but she stands accused of having caused the deaths of various persons who stood in the way of the succession of her own children. She was even suspected of having hastened by poison the death of Augustus himself. On the accession of Tiberius, his jealousy removed her from the court, and his hatred was manifested even after her death.

Livingston, Edward, 1764-1836; American jurist; b. Clermont, N. Y.; son of Robert R. Livingston; began the practice of law in New York; was twice mayor of the city; judge of a municipal court, and, 1795-1801, a Jeffersonian member of Congress; removed, 1804, to New Orleans; spent many years in preparing civil and criminal codes for Louisiana, which were his chief literary labors, and won for him a wide fame in Europe and in Spanish America; was a member of Congress, 1822-29; U. S. Senator, 1829-31; Secretary of State, 1831-33; minister to France, 1833-35.

Livingston, Philip, 1716-78; signer of the Declaration of Independence; b. Albany, N. Y.; son of Philip Livingston; became a prosperous merchant and official of New York City; was Speaker of the House of the Colonial Legislature, 1768; member of the Continental Congress, 1774-78; president of the Provincial Congress, 1776; member of the New York General Assembly, 1776, and of the first State Senate, 1777; was one of the founders of the New York Chamber of Commerce and of the Society Library, and materially aided Yale and Columbia colleges.

Livingston, Robert R., 1746-1813; American statesman; b. New York City; son of first Robert R. Livingston (who assumed the initial to distinguish him from other members of the family having the same name), and brother of Edward Livingston; was recorder of New York, 1773-75; member of the Continental Congress, 1775-77 and 1779-81; on the committee which reported the Declaration of Independence; Secretary of Foreign Affairs, 1781-83; chancellor of New York, 1777-1801; member of the New York convention which ratified the Constitution of the U. S.; was instrumental, while U. S. Minister to France (1801-4), in effecting the purchase of Louisiana; was associated with Robert Fulton in perfecting steam navigation; and was one of the introducers of merino sheep into the U. S.

Livingston, William, 1723-90; American statesman; b. Albany, N. Y.; brother of Philip Livingston (the "Signer"); became a lawyer and journalist; removed, 1773, to Elizabethtown, N. J.; was elected, 1774 and 1775, to the Continental Congress; became, 1775, brigadier general of militia; was Governor of New Jersey, 1776-90; a member of the convention which, 1787, drew up the Federal Constitution; and was a writer of ability.

Livingstone, David, 1813-73; Scottish missionary and explorer; b. Blantyre, near Glasgow, where, impelled by religious enthusiasm and a passion for traveling, he studied theology and medicine, while working in a cotton mill, to fit himself for the work of a missionary. In 1838 he offered his services as a missionary to the London Missionary Society, and, 1840, was ordained and went to Kuruman, S. Africa. He was engaged in the service of the London Society sixteen years, and meanwhile married the daughter of the Rev. Robert Moffat, the distinguished missionary. In 1849 he made his first journey of exploration, discovered and surveyed Lake Ngami, and, 1853, started on the great journey that made him famous. The heathen Makololo chief, Sekeletu, gave him men, ivory, and trading commissions that enabled him (1853-56) to travel from the Zambesi to Loanda on the W. coast and then to retrace his steps across the continent to the mouth of the Zambesi. He returned to England and wrote his "Missionary Travels and Researches in South Africa," which made his name well known. In 1858 he returned to Africa, and, supported by the government and accompanied by several scientific associates, started on an exploring journey up the Zambesi and Shiré rivers, the greatest results of

which were the discovery of lakes Nyassa and Shirwa, and the salubrious Blantyre Highlands. He then spent nearly two years (1864-65) at home publishing "A Narrative of an Expedition to the Zambesi."

Livingstone returned to Africa, 1866, to discover the ultimate sources of the Nile. Little was heard from him during the seven remaining years of his life, but they were years of great discoveries, and, in part, of great privations and suffering. He was destitute of means to send tidings to his friends, and direful rumors of his fate were spread abroad. The New York *Herald's* Livingstone search party, commanded by Henry M. Stanley, found the explorer, 1871, at Lake Tanganyika. He could not be induced to return home, but worked on till he died, having no resources part of the time except what the natives gave him. In these seven years he discovered and partly mapped the large E. system of Kongo sources, beginning with the Chambezi River near Lake Nyassa. Following these rivers for hundreds of miles, discovering lakes Bangweolo and Moero, through which they run, and deterred at Nyangwe from following the Kongo to the sea only by lack of means, he believed to his death that the large part of the Upper Kongo water system he had traced belonged to the Nile. He died on the shore of Lake Bangweolo. His heart was buried where he died, and his embalmed body was carried by his servants to the coast, whence it was taken to England and buried in Westminster Abbey. To him is wholly due the first great impetus to African exploration and the first outburst of indignation against the Arab slave trade.

Livonia, a former government of Russia, on the Gulf of Livonia, and comprising, together with the island of Oesel, an area of 18,168 sq. m.; pop. (1897) 1,300,640; capital, Riga. The rural population consists of Letts, Livs or Livonians proper, a people of Finnic race, and Eaths, of the same race, while Germans, Swedes, and Russians form the nobility, clergy, and burghers. The great majority are Lutherans. At the beginning of the thirteenth century the Order of Knights Swordbearers was founded in Livonia, and in connection with the Teutonic Order gradually subdued all the territories surrounding the Gulf of Riga. The possession of the province was afterwards disputed by Russians, Poles, the Knights, and Sweden, to which it was ceded, 1660. The Treaty of Nystadt, 1721, annexed it to Russia.

Livre (lèvr'), former French standard unit of weight; was to the pound avoirdupois as 17.267 to 16. Also, a former French coin, superseded, 1795, by the franc, which is to the *livre tournois* (the old standard) as 81 to 80, the Persian livre being to these figures nearly as 100. Still other livres were in use.

Liv'y (TITUS LIVIUS), 59 B.C.-17 A.D.; Roman historian; b. Patavium (Padua). All that is known concerning his life is that he resided during the greater part of it in Rome; that he was married and had at least one son and one daughter; that he enjoyed the patronage and friendship of Augustus; and that he

returned to Padua some time before his death. His history of Rome, termed by himself "Annales," was in 142 books, and embraced the period from the foundation of the city to the death of Drusus, 9 B.C. Only thirty-five of these books have been preserved; written in a remarkably graceful and energetic style; but we have dry epitomes of the whole, compiled by an unknown author, which are valuable as furnishing a complete index of the whole period of Roman history, and as being the sole authority for some periods. The books which are now extant were brought to light at various dates from the revival of learning to the year 1615, the earliest editions having included only twenty-nine books. Many of the fragments have been since discovered. Great exertions were made by Leo X and by other potentates as late as Louis XIV to recover the lost portions, but the pursuit has always been in vain. Of Livy's epistles, dialogues, and treatise on philosophy, not a fragment remains.

Lizard, common name of several families of saurian reptiles. They lay their eggs in the sand and abandon them, though some bring forth their young alive. Lizards vary in length from a few inches to 3 or 4 ft.; the colors are often pleasing, but the tints vary much according to sex, age, and season. They are very rapid in their movements for short



GREEN LIZARD (*Socerta viridis*).

distances, both on land and in the water; the loss of the tail is frequent from various accidents, but it is very soon replaced; from their scaly covering the sense of touch must be dull; so also are smell and hearing; the moist and movable tongue indicates greater development of the sense of taste; vision is generally very good. The Gila monster of Arizona is the only lizard that has poison glands. Lizards feed mostly on insects and small birds, though some feed on vegetables.

Lizard's Tail, plant with heart-shaped leaves and long, slender, gracefully curving spikes of white flowers, growing in large clumps in swamps and along the margins of ponds and slow rivers from New York W. and S.

Llama (lā'mā), member (*Auchenia lama*) of the camel family, found in the Andes, especially in Peru, in a state of domestication. Except in color it very much resembles the guanaco, and is believed to be merely a long domesticated race of that species. The llama is rather lightly built, has a long body, and long, slender neck. The animal stands about 3 ft. high at the shoulders. The color is white,

marked with brown or black spots, or sometimes nearly black. The llama was domesti-



LLAMA (*Auchenia lama*).

cated by the ancient Peruvians, who used it as a beast of burden, ate its flesh, and wove the long hair into garments.

Llandudno (lān-dūd'nō), much-frequented watering place in Carnarvonshire, Wales; picturesquely situated on a sheltered bay of the Irish Sea, at the mouth of the Conway. Two lofty promontories, Great Orme's Head and Little Orme's Head, protect the bay against the sea.

Llano Estacado (lā'nō ēs-tā-kā'dō), Spanish, "staked plain," so called from the stakelike boles of a yucca plant which grows there; elevated plateau of NW. Texas and SE. New Mexico, having an area of 44,000 sq. m. and an elevation of from 3,200 to 4,700 ft., the general slope being to the N. It has very few streams and water holes, and a sparse coating of grass in the wet season. Its scanty shrubs have enormous roots, which afford the best attainable supply of fuel. The climate is so dry that in the absence of water for irrigation agriculture cannot be pursued.

Llanos (lā'nōs), Spanish, "level," name of those vast plains or steppes in the N. part of S. America which surround the lower and middle course of the Orinoco. In the dry season they are scorched by the sun and nearly transformed into a desert, and the large herds of wild horses and cattle which inhabit these plains become almost crazy from thirst, and run furiously along, tortured by poisonous insects and raising immense clouds of dust. In the wet season the plains are mostly inundated, and become an immense sea where the herds swim from hill to hill carrying their young ones on their backs to protect them against the alligators. In spring and fall, or rather during the period which separates the dry and the wet season, the llanos present the most luxuriant pasturages, and are a true paradise for cattle.

Llewelyn (lō-ēl'īn) ap Grif'fith, d. 1282; Prince of Wales; succeeded his uncle David, 1246; revolted from his allegiance to the English crown, and ravaged the frontier; was joined by De Montfort, 1263, and defeated Mor-

timer, 1264; made peace with Henry III, 1267; was summoned to do homage by Edward I, but refused to appear, and demanded the release of his bride, Eleanor de Montfort, who had been captured by English vessels in the Channel, 1275; war began, and Llewelyn was forced to surrender his territories, 1277, but Eleanor was released and married to him. He became reconciled to his brother David, and renewed the war with the English, 1282, but was surprised and killed by Mortimer.

Llorente (lyō-rēn'tā), **Juan Antonio**, 1756-1823; Spanish author; b. near Calahorra, Spain; ordained priest, 1779; became vicar general of the Bishop of Calahorra, 1782; commissary, 1785; and Secretary General of the Inquisition, 1789. An attempt to draw up a plan of reform of the Inquisition, made by him with others, resulted in his arrest, 1791. In 1808 he became one of the most devoted partisans of the French. King Joseph made him a state councilor, and on the suppression of the Inquisition charged him with writing its history. At the same time he gave him the superior administration of the so-called national property. Being exiled by Ferdinand VII, 1814, he went to Paris, where he finished his "History of the Spanish Inquisition," published in Spanish, but at the same time translated into French. Immediately after its publication he was suspended from ecclesiastical functions.

Lloyd (loid), **Henry**, 1729-83; English soldier; b. Wales; entered the Austrian service during the Seven Years' War; afterwards joined the army of Frederick the Great; made two campaigns as aid-de-camp to Prince Ferdinand of Brunswick; and, 1768, entered the Russian service as major general. After more than thirty years' absence he returned to England, and wrote "A Treatise on the Composition of Different Armies, Ancient and Modern."

Lloyd-George, **David**, 1863- ; English statesman; b. Manchester; adopted the profession of law; entered Parliament as a Liberal in 1890; became President of the Board of Trade in 1905, Chancellor of the Exchequer in 1908, Minister of Munitions in 1915, and Secretary of State for War and Premier, both in 1916. He was one of the most conspicuous members of the Peace Conference in 1919, and one of the "Big Four."

Lloyd's, name of subscription rooms on the first floor of the London Exchange, where merchants, shippers, and underwriters attend to obtain shipping intelligence, and where the business of marine insurance is carried on. One large room, with small rooms attached to it, is occupied by the underwriters, who have agents in all parts of the world to report casualties and to attend to their interests. The merchants' room is provided with newspapers from all parts of the world, and open to subscribers. The third room is called the captains' room, where captains and merchants meet, and where ship auctions were held. "Lloyd's List," published daily, contains the latest shipping intelligence.

Load'stone, natural magnet; a mineral consisting essentially of magnetic iron ore, which is a compound of the peroxide and protoxide of iron; strongly attracts the magnetic needle, but does not itself always possess polarity. See **MAGNET**.

Loam, mixture of sand and clay, with an addition of about 5 per cent lime and some animal and vegetable matter. A loamy soil is intermediate in character between sandy and clayey soils, and is that best adapted to general agriculture. It is lighter and warmer than a clay soil and stronger and more retentive than a sandy one.

Loan and Building Associations. See **BUILDING AND LOAN ASSOCIATIONS**.

Loango (lō-ān'gō), territory on the Atlantic coast of Africa; between lat. 3° S. and the Kongo Independent State; was the sea front of the former province of Loango of the native Empire of Kongo; was acquired by France by treaty, 1883, and divided between the Kongo Independent State, France, and Portugal by the Berlin Conference, 1885. The most important place is Loango, which is visited by French, British, and German steamers, and does a fair business in rubber, palm oil, and ivory. It is little more than a collection of European trading factories, though when it was under native control it had a population of abt. 15,000.

Lobau (lō-bō'), **Georges Mouton** (Count de), 1770-1838; French soldier; b. Phalsbourg; enlisted, 1792; became general of division, 1807; stormed Mérida, in Spain, 1808; contributed to the fall of Burgos, and, 1809, preserved a corps that had been left on the island of Lobau, in the Danube, near Vienna, after the battle of Essling, whence he received his title. After participating in the Russian campaign and the battle of Leipzig, he was a prisoner in Hungary till the first Restoration. He was captured by the English at Waterloo and detained till 1818; became a Deputy, 1828; took part in the Revolution of 1830; and was made a peer and marshal.

Löbau (lō'bow), island in the Danube; 6 m. below Vienna; was taken by Napoleon I, May 19, 1809; occupied by the French army after the battle of Aspern, May 22d; was the place whence the invading forces were concentrated in June, and where the celebrated passage of the Danube was made, July 4th and following days, 1809. This island gave the title of count to Gen. Mouton, one of the French heroes of the campaign.

Lobby, body of persons who, not being members of the legislature, are engaged in influencing legislators to vote for or against particular measures that come before them. This meaning is doubtless due to the fact that persons who wish to consult legislators are often to be met in the vestibules or lobbies of legislative chambers. Although the word is more often used in an evil sense, it is true that much of the influence exerted by lobbyists is entirely legitimate. The causes of the existence of the lobby in connection with nearly all

legislative bodies become evident on brief consideration. (1) The legislator needs the advice and assistance of specialists to enable him to form an intelligent judgment on very many of the questions that come before him for action. (2) The system of legislation in vogue in the U. S., under which all bills are referred to small committees for consideration before they are brought for final action before the full Legislature, furnishes a favorable opportunity for lobbying in the vicious sense of the word. (3) Under the U. S. system of legislation, bills that are purely local or private in their nature usually follow the same course as public bills, instead of being treated semijudicially, as in England. Consequently, it is often possible for an individual or for a corporation that has great interests at stake to push a measure quietly through before its real nature has been discovered. (4) For the same reason, a dishonest legislator may bring in a bill that, if passed, would seriously injure some corporation, and force the latter to pay him to drop the measure.

The remedies for the evils of the lobby are difficult to find. The experience of legislative bodies, however, seems to have established the following propositions: (1) It is clear that the separation of private measures from public, so far as is possible, and the treatment of the former in a semijudicial manner, with full notice to all parties interested, would remove a large part of the evil. (2) The evil sometimes works its own cure in part. In New York, after the exposure of the Tweed corruptions, members were very fearful of being suspected of corruption, and to this day the report that a bill has money behind it is enough to cause many timid members to vote against it with little regard for its merits. (3) Of course, every measure or change in public sentiment that tends to raise the character of the legislators intellectually or morally, lessens the evil influence of the lobby. (4) In many states of the U. S., in order to lessen the evil, the constitutions have restricted in many ways the power of the Legislature by forbidding special acts, charters, etc., and severe laws have been passed against bribery in any form. In California and Georgia lobbying is punishable as a felony, and a legislator if found guilty of taking a bribe is punishable as a felon, disfranchised, and forever disqualified from holding any office of public trust. (5) The Massachusetts Legislature has passed a law by which every promoter of any law in the interest of others is registered and known as the regularly employed attorney or lobbyist. Failure to register on the part of such an attorney is severely punished. The New York Legislature passed a similar law, 1907.

Lobeira (lô-bă'ê-ră), Vasco de, abt. 1360-1403; Portuguese soldier; was distinguished in the military service of Ferdinand IV, King of Castile; wrote the celebrated romance of "Amadis de Gaul"; was knighted by John I of Portugal after the battle of Aljubarrota, 1386, and d. at Elvas, Portugal.

Lobel', Matthew, 1538-1616; Dutch botanist; b. Lille, Flanders; settled in England before

1570; made extensive botanical collections in England; devoted himself especially to vegetable physiology and the correction of errors made by Dioscorides; published "Stirpium Adversaria Nova," containing nearly 1,300 species, with 272 small figures; "Plantarum seu Stirpium Historia," "Icones Stirpium," and a treatise on "Balams."

Lobe'lia (named in honor of Matthew Lobel), genus of plants of the natural order *Lobeliaceae*, of which the most important species is the *Lobelia inflata*, or Indian tobacco, as it is commonly called. This is a very common indigenous annual or biennial herb, growing wild in waste spots throughout Canada and the U. S. It has a fibrous root and a solitary, straight, hairy stem rising about a foot high. The flowers are small and of a light-blue color; the leaves oval, serrated, and hairy. The entire herb, dried, is used in medicine under the name *lobelia*. Its properties depend on an alkaloid, *lobeline*, which is a thick, oily, transparent, volatile fluid, with a pungent taste resembling tobacco. *Lobelia* is a powerful, nauseating emetic. In overdose it is a potent acro-narcotic poison. It is too severe an emetic to be used to produce vomiting, and its medicinal employment is in nonemetic doses as a relaxing agent in asthma and allied spasmodic diseases.

Lobelia cardinal'is, scientific name of a species of lobelia, popularly called the cardinal flower, from the intense red color of the blossoms. It is the most showy of the species indigenous to N. America, and is prized in cultivation.

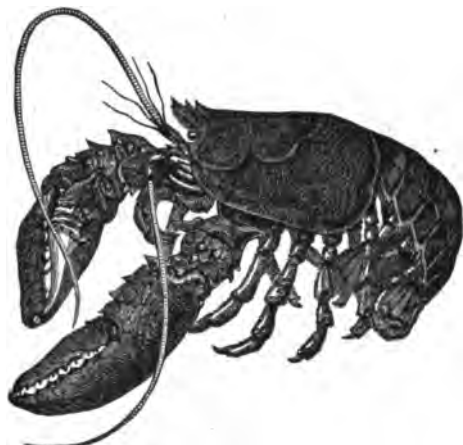
Lob'lolly Bay. See GORDONIA.

Lo'bo, Jeronimo, abt. 1593-1678; Portuguese missionary; b. Lisbon; entered the order of the Jesuits, 1609; went, 1622, as a missionary to Goa, whence he proceeded to Abyssinia, 1624; there worked with great success, but was at last expelled, 1634, and returned to Portugal to persuade the Christian powers to make a crusade against Abyssinia. Having failed in this, he went once more to Goa, 1640, whence he returned, 1656, and died at Lisbon. Lobo wrote a narrative of his travels, which made a great sensation, and was translated into many foreign tongues.

Lobos (lô'bôs), or **Seal Islands**, three small islands off the coast of Lambayeque, Peru. The Lobo de Tierra is 12 m. from the mainland; the other two are about 35 m. out. They are rocky, but of no great height, and have a small population. They are important for their extensive deposits of guano.

Lob'ster, marine crustacean, of the order *decapoda* and genus *homarus*. The common lobster of the U. S. (*H. Americanus*) varies in length, as caught for the market, from 1 to 2 ft., though specimens are seen considerably larger than this, and in weight from 2 to 15 lbs.; they are common in the markets, especially in spring and summer. They are found from the coast of New York northward; the best are taken on the rocky shores of New England N. of Cape Cod. This species is dis-

tinct from *H. gammarus* of Europe, and grows to a larger size. Their food is entirely animal. They are caught in baskets or traps, with a concave netting at each end having a hole in the center, and baited with dead fish or any garbage. By means of the flexible part of the body or "tail" they are able to dart backward with great rapidity, sometimes going 25 ft. in less than a second. Adult females produce eggs once in two years; but very few of the 3,000 to 8,000 eggs produce young which grow to maturity. The eggs are attached to the under surface of the female and carried about



AMERICAN LOBSTER (*Homarus Americanus*).

for a period of ten or eleven months; when the young hatch out, they immediately disperse and rise to the surface to feed on microscopic organisms. The lobster repeatedly molts its whole shell, and immediately after molting is as limp as wet paper and perfectly helpless. The new shell takes almost two months to harden. The genus *palinurus*, or spiny lobster, of the European seas, grows to a weight of 15 or 20 lbs.; the shell is hard and spiny, the antennae are much longer than the body, and the claws are very small; it is much esteemed as food, and was prized by the ancient Romans, who called it *locusta*.

Lo'cal Op'tion, laws empowering a political division of a state to decide upon a certain measure; in a special sense, laws authorizing the people of each locality to decide for themselves the question of permitting the sale of liquor within its limits. In the U. S. it has been advocated chiefly by those who wish to suppress this traffic altogether, but think it easier to fight it in the localities than in the state as a whole. To these are added those who, while not in sympathy with the prohibition movement, consider it fair that each locality should bear the responsibility of the continuance or suppression of the traffic within its limits. Where this system has prevailed a large proportion of the localities have prohibited the traffic. The term local option in Great Britain includes schemes for the reform of the licensing system, and for securing to localities a wider range of powers to regulate

completely the liquor traffic within their bounds.

Loch Leven (lök'h lëv'ën), small lake in Fife-shire, Scotland; containing an island on which stood the castle noted as the place where Mary Queen of Scots was imprisoned from July, 1567, until her escape, May 2, 1568. The place is now of no military or strategical importance, but was in the sixteenth century a stronghold of the first rank.

Loch Lo'mond, largest lake of Scotland; between the counties of Sterling, Perth, and Dumbarton; is 21 m. long; has an area of 45 sq. m.; receives the Endrick, Luss, and Fruin; sends its waters through the Leven to the Firth of Clyde; and is studded with islands and surrounded by grand and beautiful scenery.

Lock, Matthew, 1635-77; English composer; b. Exeter; was composer in ordinary to Charles II, and wrote for the opera and the church, but is best known as the composer of the incidental music to "Macbeth" and "The Tempest"; also wrote several musical treatises.

Lock, inclosed mechanism for fastening doors, drawers, lids, etc., by means of a movable bolt; usually operated by a portable instrument called a key, but sometimes by a turning knob or dial. The door lock used in Egypt, which is the oldest known method for fastening doors, etc., is made of wood to-day precisely as when first invented forty centuries ago, and is a good example of the "persistence of a type" in mechanism. The bolt of the lock is rectangular in cross section, open at one end, and hollow throughout the most of its length; on the upper surface of the hollow portion of the bolt are several vertical holes communicating with the hollow. The bolt slides in an inclosing box or case of wood secured to the inside of the door; when the bolt is pushed in locking, so that its solid end enters the mortise in the doorpost, a number of pins, which occupy holes in the upper part of the bolt case, drop into the holes in the upper surface of the bolt, and thus prevent its being drawn back without the use of its key—this consists of a flat bar of wood small enough to enter easily the hollow end of the bolt. On the upper surface of this key bar are fixed a number of vertical pins, placed in the same relation to each other as the holes in the top of the bolt, and of the same height as the thickness of the wood through which they are bored. When this key is pushed as far as it will go into the hollow end of the bolt and then raised vertically, the pins in its upper surface will enter and fill the holes in the bolt, and so raise the pins which secured it in its locked position; then the key with the bolt attached is drawn back, thus unlocking the door.

The *tumbler lock* is, next to the Egyptian, the oldest type of lock, and there is evidence that the Chinese invented it very early in their history. It derives its name from a lever, latch, or slide, entering a notch in the bolt, which in consequence cannot be moved until the *tumbler* is lifted by a key. There have

been endless modifications of the tumbler lock, and it is very generally used, notwithstanding the fact that it can be picked by a skillful operator.

The *warded lock* was the next species of lock invented; it derives its name from certain obstructions of more or less irregular shape attached to the lock case in the path of the key, which are intended to make it impossible to move the bolt unless the key has openings in its bit which will enable it to pass the wards. Locks of this kind were used by the ancient Romans long before the beginning of the Christian era, and are still very largely used when a cheap lock will answer the purpose.

The *letter or dial lock* was the fourth type of lock devised. Its invention has been attributed to M. Regnier (director of the Musée d'Artillerie at Paris) abt. 1650, but he was probably merely an improver of a style of lock invented by another. Regnier's locks were for a time very popular, and were used for the fastening of diplomatic dispatch boxes. They have been described as follows, viz.: "Broad steel rings, 4, 5, or 8 in. deep, upon each of which the alphabet was engraved, turned on a cylinder of steel, and the lock only separated when the letters forming a particular word were in a straight line with each other. This word was selected from among a thousand, and the choice was the secret of the purchaser. Anyone not knowing the words might turn the rings round for years without finding the right one." The concluding sentence of this description is erroneous, as these locks have been frequently opened without a previous knowledge of "the word."

The four types of lock described are the foundation facts of lock construction, on which all subsequent improvements in such mechanism rest; and it is difficult to conceive it possible to make a lock without employing one or more of the ideas involved in these four typical methods of construction. It is therefore to a combination of these primary lock mechanisms, with other details, whose sole object is to guard them from successful assault from criminal ingenuity, that we are to look for absolute security in lock construction, if indeed such a result is attainable. It generally happens that as soon as a lock seems to meet all requirements some burglar or enterprising business rival discovers some hitherto unimaginable method of picking.

Locke, David Ross (better known under his pen name, *PETROLEUM V. NASBY*), 1833-88; American humorist; b. Vestal, N. Y.; learned printing in the office of the *Cortland Democrat*; was successively editor and publisher of the *Plymouth (Ohio) Advertiser*, the *Mansfield (Ohio) Herald*, the *Bucyrus Journal*, and the *Findlay (Ohio) Jeffersonian*, and editor of the *Toledo Blade*. In 1861 he began to publish in the *Jeffersonian* his "Nasby" letters, finally collected in book form as "The Struggles—Social, Financial, and Political—of Petroleum V. Nasby."

Locke, John, 1632-1704; English philosopher; b. Wrington, Somersetshire. He was a

member of Christ Church, Oxford, 1651-84, during which time his mind received that which gave him his subsequent renown as a philosopher chiefly by the reading of Descartes. After receiving his degrees he applied himself principally to medicine, which occupied much of his attention through life. In 1664 he was secretary of legation at Berlin; 1667, became acquainted with Lord Ashley, afterwards Earl of Shaftesbury, who, in gratitude for medical advice, received the young philosopher as a member of his family. During this time he directed the education of Shaftesbury's son, and that of his grandson, and was brought, through his patron, into the society of Buckingham, Halifax, and other distinguished men. When Shaftesbury became Lord Chancellor he gave to him the office of the presentation of benefices; but Locke and his patron soon fell into disfavor, and, 1675-79, Locke was in France, mainly at Montpellier with Herbert, later Earl of Pembroke, to whom he dedicated his famous essay. In 1683-88, on account of the state of his own country, he deemed it wise again to reside abroad. The revolution of 1688 enabled him to return from Holland to England, where he filled several civil offices, and was offered others, which on account of age and ill health he declined. His last years, spent in the study of the Scriptures, were ministered to by Lady Masham, a daughter of Ralph Cudworth. He died at Oates, Essex, a firm believer in the Christian religion.

The "Essay on the Human Understanding," which contains Locke's system, did not appear in London until 1690. It was translated into Latin, Dutch, and German several times, and since into modern Greek. The "Essay" was the product of meditation continued through many years, was composed at intervals, and is in a studied colloquial and rather racy style, which is too figurative, ambiguous, various, and even contradictory, for the purposes of philosophy. His object was to inquire into the origin, certainty, and extent of human knowledge, and his method was purely psychological, by the patient and tentative observation of the phenomena of consciousness. He published, 1690, two "Treatises on Civil Government," written to support the principles of the revolution; 1693, his "Thoughts Concerning Education"; and, 1695, "The Reasonableness of Christianity." His treatise on the "Conduct of the Understanding," which may be regarded as the ethical application of his "Essay," being a scheme of the education which an adult person should give himself, appeared after his death.

Lockhart, John Gibson, 1792-1854; Scottish author; b. Cambusnethan, Lanarkshire; graduated from Balliol College, Oxford, 1817, as bachelor of law; became, 1817, a contributor to *Blackwood's*, in which his articles were remarkable for vigor and scholarship; married, 1820, the daughter of Sir Walter Scott; was editor of *The Quarterly Review*, London, 1828-53; received, 1843, the sinecure auditorship of the duchy of Cornwall; was one of the writers of the "Noctes Ambrosianæ"; principal works, "Valerius," "Adam Blair," "Reginald Dalton," and "Matthew Wald," novels; "Don

Quixote," with notes; "Spanish Ballads," "Life of Burns," of "Bonaparte," and of "Scott."

Lock'jaw. See TETANUS.

Lock'out, in law, the refusal of an employer to continue or receive in his employ a body of men as such, usually intended as a means of coercing them into a certain course of conduct. A lockout is the natural accompaniment or complement to a strike, and is the means employed by the employer of labor to oppose and meet the influences and coercion brought to bear upon him by the striking of organized labor, whether in his employ or so as to affect his interests. The term is sometimes applied to the act of employees who, by assembling in large bodies or by threats or other coercion, prevent other employees from access to or departure from their place of employment.

As the law will not compel any man to continue in the employment of any private individual against his will, so neither will it compel any man to continue to employ another against his will, although it may award damages by way of breach of contract should this arise. Every individual has the right of absolute control over his own property so far as it does not conflict with the equal rights of others in the same community; and the conduct of others, whether in his employ or not, who attempt to control or to hinder or to annoy or interfere with the individual in the conduct and management of his property or business is unlawful, and furnishes a sufficient legal reason for the employer to discharge from his employ any parties concerned in the combination, notwithstanding that their period of service as per contract may not have expired. Participation in a combination to effect such a purpose unlawfully constitutes a criminal conspiracy for which the employer not only has his remedy at the criminal law, but also a civil remedy in damages.

So far as concerns the act of a single employer in establishing or giving up a lockout, or in the refusal to employ any one person or class of persons for any reason whatever, the law is comparatively simple; but the laws relating to the right of employers to combine in a refusal to employ men because they belong to certain organizations or for other reasons, and their liabilities when so combining, are much more complicated, and they are largely analogous to the law governing strikes by employees. Employers have the same right to combine in order to aid and assist each other—whether for their own improvement or the improvement of their business methods, or the determination of the rate of wages they will pay or the class of employees they will hire—that employees or workmen have to combine for similar purposes. In general, they have the right to combine or associate for any lawful purpose; but where their combination or confederation is so made as to cause injury or oppression to others in their legal rights, and compel them by force or violence or intimidation not to do what they have a right to do, or to do what they are under no legal obligation to do, they are guilty of a criminal con-

spiracy in the same manner as workmen guilty of conspiracy in a strike. See STRIKES.

Lock'port, capital of Niagara Co., N. Y.; on the Erie Canal; 25 m. N. by E. of Buffalo; is near the geographical center of one of the most profitable grain and fruit-growing counties in the state, and derived its name from five locks cut through solid rock to overcome a difference of 60 ft. in the levels of the canal, and doubled in number on the enlargement of the canal, 1835. The surplus water at the upper level is discharged through two races, each with a fall of 53 ft. to the lower level, thus supplying exceptional power for manufacturing. The industries include the manufacture of Holly water-works plants, milling machinery, indurated-fiber products, flour, steam dredges, boilers, engines, railway trucks, aluminium, glass, carriages, furniture, paper, tackle blocks, saws, reversible seats, and stave, broom, veneer, and chair-making machinery. Pop. (1910) 17,970.

Lock'wood, Belva Ann Bennett, 1830-1917; American lawyer; b. Royalston, N. Y.; taught school at fifteen; was married at eighteen, but lost her husband the next year; wrote for papers and magazines; graduated at Genesee College, Lima, N. Y., at twenty-seven; taught school eleven years; was married to Dr. Ezekiel Lockwood, 1868; studied law; graduated at the National Univ. at Washington, D. C., and was admitted to the bar of the District, 1873. She was nominated, 1884 and 1888, for President of the U. S. by the Equal Rights Party; was a U. S. representative to the Congress of Charities and Correction in Geneva, 1896; elected president of Woman's National Press Association, 1901; delegate to Arbitration Convention, New York, 1907; one of nominating committee for Nobel Peace Prize.

Lock'yer, Sir Joseph Norman, 1836- ; English astronomer; b. Rugby, Warwickshire; first became well known through the discovery that the solar protuberances were composed of glowing hydrogen, and could be observed on any clear day with a spectroscope. Lockyer principally devoted himself to ancient astronomy, solar physics, and spectroscopic observations generally, on which subjects he wrote a number of works, including "Contributions to Solar Physics," "The Spectroscope and Its Applications," "Studies in Spectrum Analysis," "The Meteoritic Hypothesis," "The Dawn of Astronomy"; became editor of *Nature*; president of British Association for the Advancement of Science, 1903-4; knighted, 1897.

Locle (lök'l), town in canton of Neuchâtel, Switzerland; on the Bied; 10 m. NW. of Neuchâtel. Its manufactures of clocks and watches are very celebrated, and the most extensive in the world, and those of lace are also important. The surplus water of the Bied is discharged into the Doubs through an artificial tunnel constructed to prevent inundation of the valley of the Bied. Pop. (1900) 12,628.

Locofo'co (Lat. *locus*, place; *focus*, hearth, fire), in U. S. political history, a faction of the Democratic Party in New York, 1835-37, more correctly called the Equal Rights Party. They

opposed special legislation for the chartering of banks and the granting of privileges to corporations; they favored "hard," as opposed to "soft," money; and were essentially radical. The faction tried to hold a meeting in Tammany Hall, October, 1835, whereupon the Regular Democrats, after unsuccessfully attempting to control the meeting, withdrew and turned out the lights. But the meeting was supplied with candles, which were lighted with "loco-focos" (as friction matches were then called), and the business of the meeting was continued. The name "Locofoco" was soon applied to the faction and, for some years, to the whole of the Democratic Party. President Van Buren, in a message of September 4, 1837, having expressed views in conformity with those held by the Locofocos, the faction soon thereafter was reabsorbed into the Regular Democratic Party.

Lo'comotive, or Locomotive En'gine, engine mounted on wheels and capable of self-propulsion; commonly one operated by steam or electricity, and intended for traction or propulsion on a railway. The steam railway locomotive consists of a steam boiler of compact

elastic springs, which prevent the jar and shock of the wheel on the roadbed reaching the machinery and make the engine ride easily.

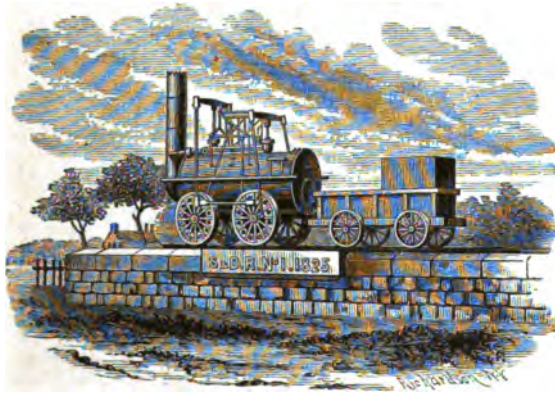
Standard engines now weigh about 50 tons, often 75, for passenger traffic on the leading railways. Such engines have steam cylinders 20 to 26 in. in diameter and 2 ft. stroke of piston, their boilers containing from 30 to 40 sq. ft. of grate surface and 1,500 to 2,500 sq. ft. of heating surface. The standard steam engine uses 25 to 30 lbs. of steam per horse power per hour, 3 to 4 lbs. of fuel; the compound, from 22 to 26 lbs. of steam and from 2.5 to 3 lbs. of good coal. Either engine hauling a train exerts a pull of from 1 to 2 tons on its drawbar and from 500 to 1,200 horse power. In exceptional instances, with heavy trains or extraordinarily high speeds, 1,500 or 1,800 horse power has been attained. The engine has a life of about thirty years, costing 10 to 15 per cent of its value for repairs and maintenance, and uses a quart of oil and a ton of coal usually for a run of 60 m. under average conditions.

The costs of operation of the steam locomotive average in the U. S. not far from 15 cents per "train mile," nearly equally divided between expense for fuel, for attendance, for repairs, and miscellaneous minor items.

The smallest kinds of locomotive are those employed in mines for drawing small trains of light cars or wagons to the shafts; the heaviest are employed on the principal railways of the U. S. for hauling long and heavy trains or ascending steep gradients. The former weigh about 5 tons; the latter sometimes weigh 100 tons—e.g., the famous engine "999" of the New York Central Railroad, which first made a record, 1893, of 102, and later, in exceptionally favorable circumstances, of 112 m. an hour.

The largest locomotives in the world—of the Mallet compound type—are used for freight service over the Cascade Mountains, Washington, by the Great Northern Railroad. Each has two sets of drivers and two pairs of cylinders, being practically two engines in one. At least one of these has a weight on the drivers of 316,000 lb., while the total weight of the engine is 355,000 lb. and the weight of the engine and tender is 503,000 lb. It has a rating of being able to pull 2,100 tons of freight. The tank on the tender carries 8,000 gals. of water, and the tender also carries 13 tons of coal. The first engine worked by steam was put into successful operation by its inventor, George Stephenson, of England, 1814. In 1829 the Rocket, built by his nephew, Robert Stephenson, Jr., made its trial trip. It weighed but 7½ tons, and drew 44 tons at the rate of 14 m. an hour, which was considered a wonderful achievement. In the same year the first engine operated in the U. S., the "Stourbridge Lion," made a trial trip at Honesdale, Pa. This weighed between 8 and 9 tons.

The first electric locomotive of any consider-



STEPHENSON'S NO. 1 ENGINE, 1825.

form, filled as completely as possible with tubes, which convey the furnace gases to the smokestack and transfer heat from them to the water in the boiler. It is mounted on from four to twelve wheels, according to weight and special duty, and is driven by a pair of engines of the simplest construction, each coupled to its own set of wheels on either side of the locomotive. The whole combination, boiler, engines, and wheels, is connected by a frame of wrought iron in such a manner as to give maximum power in minimum space and weight. The standard eight-wheeled engine usually distributes the total weight, two thirds to the driving wheels, one third to the truck. The proportion carried by drivers increases with severity of duty up to a maximum, when all the weight is sometimes taken on driving wheels, and the truck is displaced by the extended system of six, eight, or ten coupled drivers. The whole mass of engine and boiler is supported on heavy and very

able size in the U. S., and the first practically operative high-speed electric locomotive in the world adapted to the steam railroad, was exhibited at the World's Columbian Exposition, 1893. It was a 30-ton engine, designed for a normal speed of 30 m. an hour, primarily intended for operation on elevated railroads and for passenger and light-freight traffic on less important steam roads. The propelling power was furnished by two electric motors, each axle being provided with one motor. The drawbar pull was calculated at 12,000 lbs. In 1905 trials were made with an electric locomotive for the New York Central and Hudson River Railroad, the competitive steam locomotive being one of the Pacific type, the most powerful used in their passenger service. The trials took place on a stretch of road 6 m. in length, which had been electrically equipped. The total weight of the electrical locomotive was 200,500 lbs., with a weight of 142,000 lbs. on the drivers. The total weight of the steam locomotive, including the tender, was 342,000, with a weight of 141,000 lbs. on the drivers. The cars in the electric train were loaded, and weighed 50 tons each; the power was derived from a steam turbine in a remote power station. On the fourth trial, each train consisted of six cars, those drawn by the steam locomotive being empty. From a standing start the electric locomotive reached a speed of 50 m. an hour in 127 seconds; the steam locomotive attained the same speed in 203 seconds. In 1905 the Quayside branch of the Northeastern Railway Company, of England, applied heavy electric locomotives to its freight service, each being equipped with motors of 800 horse power, and capable of dealing with a load of 150 tons on the heaviest gradient, exclusive of the weight of the locomotive, which is 57 tons. Each locomotive measures 37 ft. 6 in. over buffers, is mounted on two four-wheel bogies, each axle being motor driven, and is fitted with four G. E. motors, geared to 36-in. wheels, at a ratio of 3.29 to 1. See ENGINE.

Locomo'tor Atax'ia, or **Ta'bes Dorsa'lis**, chronic affection of the posterior columns of the spinal cord, characterized by incoördination, sensory and nutritive disturbances, and a loss of the light reflex of the pupil. It is a disease of middle life, and is much more frequent in men than women. The disease usually begins with attacks of violent, stabbing pains in the legs, coming on suddenly and lasting only for a moment, recurring for months before the onset of other symptoms, and usually diagnosed as rheumatic. On examination, the knee jerks are found to be absent, and later the superficial reflexes also disappear. The pupils are small, and while still contracting on accommodation, cease to do so when exposed to light. Later the characteristic gait due to incoördination appears. The foot is raised too high, is thrown violently forward, and the entire sole touches the floor at once. Walking is made much more difficult by closure of the eyes, and on attempting to stand with the feet close together and the eyes shut the whole body sways, sometimes so violently as to throw the patient to the floor. Incoördination is also

present in the hands. On trying to touch the nose or ear with the finger, the eyes being closed, it goes wide of the mark. The disease extends over many years. Death usually results from some intercurrent affection. While locomotor ataxia never causes disease of the mind, one form of insanity (general paralysis) occasionally begins with identical spinal symptoms. Fully developed locomotor ataxia is incurable, but treatment may benefit and for a time even stay the progress of its course.

Lo'co Weed, or **Cra'zy Weed**, a perennial plant which grows on the plains of the middle W. states of the U. S. The purple loco weed (*Astragalus mollissimus*), called the "wooly loco weed" because of the soft, silvery hairs upon its leaves, grows in patches and has small, inconspicuous purple flowers. When eaten by horses it produces much the same effect as intoxication in man, with inability to control action of limbs, nervous excitability or listless dejection, accompanied by loss of weight. Another species, the white loco weed, called "rattle weed" (*Aragallus lamberti*), is somewhat similar in appearance, but has white flowers, and is eaten also by sheep and cattle, who do not ordinarily eat the purple loco. The effect of the white loco is the same as that of the purple weed. Locoed animals receiving medical treatment before the last stage of the disease can usually be cured.

Lo'cri, or **Locri Epizephy'rii**, ancient city of S. Italy, on the SE. coast of the Bruttian Peninsula; was founded by a colony from Locris, Greece, in the seventh century B.C.; and became celebrated by the laws of Zaleucus. In later times Locri was generally an ally of Syracuse. It sided with Pyrrhus of Epirus, 280, and with Hannibal, 216, but was finally subjected by Rome, 205. It existed as late as the sixth century A.D., and was probably destroyed by the Saracens.

Lo'cris, ancient name of two portions of the mainland of Greece, inhabited by a kindred people having the name of Locrians. The E. Locrians, divided by a projecting tongue of Phocian territory into two divisions, inhabited a narrow strip of land along the E. coast of Greece opposite Eubœa. The W. representatives occupied a territory shut in by mountains on the Corinthian Gulf, between Ætolia, Doris, and Phocis. They were proverbially a wild and uncouth people.

Lo'cust, properly the migratory locust of the Old World (*Edipoda migratorium*) and the locust of W. N. America (*Caloptenus spretus*). The term "locust" is often wrongly applied to the cicada or seventeen-year locust. The transformations of the locust, as in all the grasshoppers, are very slight, the larva differing from the adult chiefly in wanting wings; but in this state even they are said by African travelers to travel great distances. The eggs are large, long, cylindrical, and laid late in the summer in packets of about seventy-five, resembling cocoons, in holes bored in the ground by means of their stout, horny ovipositors or egg-laying organs. The shrill noise



PACIFIC TYPE.

EXPRESS PASSENGER SERVICE. WEIGHT OF ENGINE AND TENDER, 390,000 LB.



SIX COUPLED LOCOMOTIVE.

HEAVY SWITCHING SERVICE. WEIGHT OF ENGINE AND TENDER, 304,000 LB.



CONSOLIDATION TYPE.

HEAVY FREIGHT SERVICE. WEIGHT OF ENGINE AND TENDER, 360,000 LB.



MALLET ARTICULATED COMPOUND TYPE.

HEAVIEST FREIGHT LOCOMOTIVE IN THE WORLD. WEIGHT OF ENGINE AND TENDER, 700,000 LB.



MALLET ARTICULATED COMPOUND TYPE.

HEAVIEST PASSENGER LOCOMOTIVE IN THE WORLD. WEIGHT OF ENGINE AND TENDER, 610,000 LB.



PENNSYLVANIA RAILROAD ELECTRIC LOCOMOTIVE.

WEIGHT, 330,000 LB. HORSE POWER, 4,000.



ELECTRIC LOCOMOTIVE USED ON THE NEW YORK CENTRAL LINES.

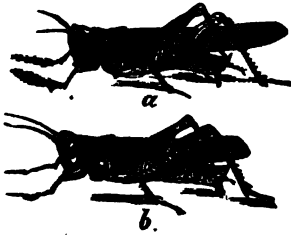
WEIGHT, 230,000 LB. HORSE POWER, 2,200.



ELECTRIC LOCOMOTIVE USED ON THE GREAT NORTHERN LINES.

WEIGHT, 230,000 LB. HORSE POWER, 1,500.

this and many other grasshoppers make is produced by rubbing the thighs against the wings. The migratory locust of the Old World is widely distributed, being found all over Africa, in W. Asia, and S. Europe, sometimes occurring in Belgium and England. It is said to travel about 16 m. a day. It molts five times, at intervals of about six weeks. The locust is



THE LOCUST OF NORTH AMERICA. Red-legged grasshopper, and its long-legged Western variety.

eaten and relished by the natives of the country in which it is found as nutritious food.

The locust of N. America is the widely distributed red-legged "grasshopper" (*O. femurrubrum*, Fig. b) with its allied species (*O. spretus*, Fig. a),

which inhabits the U. S. W. of the Mississippi River, though occasionally found in New England. The E. species does the most damage in N. New England and Canada. The W. species (*spretus*) breeds most abundantly in the elevated portions of Colorado and N., and migrates to the plains below; it also breeds abundantly in Iowa and Minnesota, and is so voracious as to drive farmers from their lands. The young of the *spretus* are hatched in March and April and early in May in Texas, Colorado, and Kansas, and at once begin their ravages. Late in the season, by the last of June, they acquire wings and become fearfully destructive. (See GRASSHOPPER.) They are more active by night than by day.

LOCUST, tree technically named *Robinia*. The beautiful genus belongs to the subfamily *Papilionaceæ*, of the family *Leguminosæ*. *R. pseudacacia*, the common locust of the U. S., is called false acacia from the resemblance it bears to the true acacia. The tree never attains great size in the New England or the Middle States, but reaches its perfection in Kentucky and Tennessee, where it sometimes exceeds 4 ft. in diameter, and grows to a height of 80 ft. The wood is remarkable for its strength and durability, and for its stiffness, hardness, elasticity, and weight. Fence posts, railway sleepers, and treenails in naval architecture are made of it. It is considered as durable as the live oak. It is used to some extent in cabinet making, but only slightly in house building. For mill cogs it is very valuable.

Belonging to the same family and sharing the name locust with the *Robinia*, though differing widely from it, is the genus *Gleditsia* or *Gleditschia*, represented in the U. S. by the honey locust. It is a good hedge plant and an ornamental tree. Its flowers are inconspicuous, but its large flat pods when ripe are filled with a sweet, honeylike substance. The water locust is a small tree growing in swamps in the W. and SW. There are one or two N. Asiatic species,

Lodge, Edmund, 1756-1839; English historian; b. London; served in the army in his youth, and afterwards devoted himself to anti-quarian pursuits; became a member of the *Heralds' College*; was promoted to the office of *Lancaster Herald*, 1793, *Norroy King of Arms*, 1822, and *Clarencieux King of Arms*, 1838; chief works, "*Illustrations of British History, Biography, and Manners in the Reigns of Henry VIII, Edward VI, Mary, Elizabeth, and James I.*" and "*Portraits of Illustrious Personages of Great Britain.*"

Lodge, Sir Oliver Joseph, 1851-; English physicist; b. near Stoke upon Trent, Staffordshire; became demonstrator in Physics in University College, London, 1875; assistant professor in the same institution, 1877; was Prof. of Physics in University College, Liverpool, 1881-1900; principal of the Univ. of Birmingham after 1900; was a forerunner of Hertz in the domain of electric induction; did much to make clear the function of ether in propagating electro-magnetic and electro-static disturbances; knighted, 1902; issued, 1906, the text of a catechism which he proposed as "a partially scientific basis for future religious education"; wrote an elementary text-book on "*Mechanics*," well-known semipopular volumes entitled "*Modern Views of Electricity*" and "*Lightning Guards*," "*Signaling without Wires*," etc.

Lo'di, city in Lombardy, Italy; on the Adda; 20 m. SE. of Milan; was the theater of one of the most daring and brilliant exploits of the French under Bonaparte. On May 10, 1790, Napoleon, after the terrible passage of the long and narrow bridge under the full fire of the Austrian batteries, won the memorable victory which secured him the possession of Lombardy. The cathedral dates from the twelfth century, and other churches contain fine marbles, bronzes, frescoes, and especially wood carvings of much merit. The majolica of Lodi has a high reputation; also its silk and linen; but the chief article of the Lodi market is the famous *Parmesan* cheese, which is made in immense quantities in the neighborhood. Pop. (1901) 25,000.

Lodz, city in the government of Piotrkow, Russian Poland; 76 m. SW. of Warsaw; often called the "*Manchester of Poland*," because of its extensive manufactures of cotton, woolen, and linen goods; became the second city in importance in Poland, and one of the great cotton manufacturing centers of the world. The city was the scene of a massacre by Cossacks, 1905, and of serious labor disturbances, 1905-6, and was occupied by the Germans, Dec. 6, 1914. Pop. (1910) 415,604.

Loess (lōs), exceedingly fine, unconsolidated deposit resembling clay, found under various conditions, and in some instances deserving an individual name. At many localities it rests on or is included in glacial deposits, and in all cases is referred to Pleistocene or recent times. It is composed chiefly of angular or but slightly rounded grains of quartz, its other constituents being unworn and undecomposed fragments of other minerals, with suffi-

cient calcium carbonate to cause it to effervesce with acids. The deposit crumbles readily between the fingers, but owing to its porosity, resists weathering in a remarkable degree and stands in vertical walls under various climatic conditions for many years. Its properties render it exceedingly favorable for agriculture. Loess occurs as an irregular fringe along the borders of the valleys of the Rhine and Danube, and in a similar position along the Mississippi, Missouri, Iowa, Ohio, etc., where it is known as "the bluff formation," and probably was deposited by the streams themselves when broader and more sluggish than now and highly charged with glacial silt. It also covers vast areas in central Asia, etc., while many valleys of the arid region between the Rocky Mountains and the Sierra Nevada contain a deposit similar to the loess of Asia, which is many hundreds of feet deep, and is still in process of accumulation.

Lofoten, or Lofoden, group of islands stretching along the NW. coast of Norway. The largest are Andø, Langø, Hindø, E. Vaagø, and W. Vaagø. They are high and rocky, presenting wild, rugged, and deeply indented coasts, and rising in some places of the interior to the height of 4,000 ft. The inhabitants numbered (1900) 42,817. The islands derive their importance from the immensely rich fisheries, which each summer employ nearly 30,000 men, and form a source of national wealth to Norway.

Lofthus, William Kennett, 1820-58; English archaeologist; b. Rye; was a resident of Turkey in Asia, 1849-52, as a member of the Turco-Persian Boundary Commission, and explored the sites of the ancient cities on the Tigris and Euphrates; revisited the region, 1853; published "Travels and Researches in Chaldea and Susiana," etc.; was the reputed discoverer of the city or cemetery of Warka, supposed to be the biblical Erech; afterwards employed in the geological survey of India.

Log, apparatus for obtaining the approximate rate of movement of a vessel through the water. The log is a triangular or quadrangular piece of board, one side of which is weighted with lead, so as to cause the piece to sit upright when thrown into the water. It is attached by cords from its corners to the log line, which is a stout cord about 150 fathoms long, divided by knots or slips of leather into spaces called knots, and wound on a reel which revolves with freedom. "Heaving the log" consists in dropping the wood over the stern of the vessel, with a quantity of line sufficient to reach from the vessel to the log, at the instant a half-minute glass is turned up. As the last sands run through the glass, the reel is instantly stopped. The number of knots run off in the half minute indicates the rate of motion of the vessel as a half minute bears the same relation to an hour that one of the divisions of the line does to a nautical mile. A more accurate substitute consists of a wedge-shaped box, towed astern, containing a spindle, the number of revolutions of which, produced by the action of the water on four wings attached to it spirally, is recorded by

registering wheels, somewhat on the plan of a gas meter. The log book is a record of the voyage of a ship, contains the distances traveled, weather notes, and the events of the voyage.

Lo'gan, assumed name of the American Indian chief TAH-GAH-JUTE, abt. 1725-80; was the son of Shikellamy, a chief of the Cayugas, who resided on the Susquehanna; and was called Logan, after James Logan, Secretary of Pennsylvania. In his early manhood he was known throughout the frontier of Virginia and Pennsylvania for his fine presence, his engaging qualities, and his friendship for the whites. Abt. 1770 he removed to the banks of the Ohio. In 1774 his family were massacred by whites. Logan at once instigated a war against the scattered settlers of the Far West, and for several months fearful barbarities were perpetrated on men, women, and children. He himself took thirty scalps in the course of the war, which terminated after a severe defeat of the Indians at the mouth of the Great Kanawha. He disdained to appear among the chiefs who subsequently sued for peace, but sent to Lord Dunmore, the Governor of Virginia, a speech which has become famous. Having assaulted his wife while intoxicated, and as he supposed killed her, he fled, was overtaken by a party of Indians, attacked them, and was killed by his relative Tod-bah-dohs.

Logan, John Alexander, 1824-86; American soldier and legislator; b. Jackson Co., Ill.; acquired a common-school education; served through the Mexican War; admitted to the bar, 1851; elected to the Illinois Legislature, 1852, 1853, 1856, 1857; prosecuting attorney, 1853-57; elected to Congress, 1858, 1860; resigned seat to enter Union army as colonel, Thirty-first Illinois Volunteers, which he led in battle of Belmont; promoted brigadier general, engaged in battle of Pittsburg Landing and in the West, and promoted major general, 1862; commanded division in Seventeenth Corps in Vicksburg campaign, distinguishing himself at Port Gibson, Champion Hills, and siege and surrender of Vicksburg; became commander of the Fifteenth Corps and of the Army of the Tennessee; resigned commission, 1865; declined appointment of minister to Mexico the same year; member of Congress, 1867-71; U. S. Senator, 1871-77, and from 1879 till death; Republican candidate for Vice President on ticket headed by James G. Blaine, 1884; published "The Great Conspiracy: its Origin and History" and "The Volunteer Soldier of America."

Logan, Sir William Edmond, 1798-1875; Canadian geologist; b. Montreal; was, 1829-38, manager of a coal-mining and copper-smelting enterprise at Swansea, Wales, and prepared geological maps and sections of that region for the Ordnance Survey; director of the Geological Survey of Canada, 1842-60; knighted, 1856; was the first to apply physical, as distinguished from mineralogical, criteria in the classification of the crystalline rocks of Canada, grouping them by means of their physical relations into a number of great natural systems.

Logan, Mt., highest summit in N. America; in the Alaskan Alps on the Canadian side of the international boundary; named in honor of Sir William E. Logan; stands in N. lat. $60^{\circ} 30'$, W. lon. $140^{\circ} 24'$, and has an altitude of 19,500 ft. So far as authentic measurements show, its nearest rivals on the continent are Mt. Orizaba, Mexico, 18,300 ft., and Mt. St. Elias, 18,100 ft., a near neighbor of Mt. Logan, but within the territory of the U. S. Two other peaks bear the same name. One, in N. Utah (10,000 ft.), overlooks Cache valley; the other, in N. Arizona (7,700 ft.), stands near the Grand Cañon of the Colorado.

Lo'gansport, capital of Cass Co., Ind.; at junction of the Wabash and Eel rivers; 70 m. N. of Indianapolis; has manufactures of galvanized iron, linseed oil, pumps, flour, paper, carriages, and agricultural implements; contains the N. Indiana Hospital for the Insane, several collegiate institutions, Holy Angels' Academy, and large railroad shops; and is the trade center of an agricultural region of over 100,000 population, besides being a shipping point for grain, pork, and lumber. Pop. (1910) 19,050.

Log'arithms, numbers so related to the natural numbers that the multiplication and division of the latter may be performed by addition and subtraction, and the raising to powers and extraction of roots by multiplication and division of the former. The logarithm of a number is the exponent of the power to which it is necessary to raise a fixed number to produce the given number. The fixed number is called the *base*. Thus in the equation $10^3 = 1,000$, 3 is the logarithm of 1,000, the base being 10. Any positive number except 1 may be taken as a base, and for each base there is a corresponding *system of logarithms*; there is therefore an infinite number of systems of logarithms, but only two of them are in general use—the *Napierian* and the *common* system. The Napierian system, named after its inventor, Baron Napier, of Scotland, is the system whose base is 2.718281828...; the common system is the system whose base is 10.

Napierian logarithms are mostly employed in the higher branches of analysis and in scientific investigations. Common logarithms are used in practical computations, where they serve to convert the operations of multiplication and division into the simpler ones of addition and subtraction. In trigonometric computations their use is almost indispensable. Computations by means of logarithms are made in accordance with the following principles: (1) The logarithm of the product of any number of factors is equal to the sum of the logarithms of the factors; (2) the logarithm of a quotient is equal to the logarithm of the dividend diminished by that of the divisor; (3) the logarithm of any power of a quantity is equal to the logarithm of the quantity multiplied by the exponent of the power; and (4) the logarithm of any root of a quantity is equal to the logarithm of the quantity divided by the index of the root. In applying these principles the logarithms needed are taken from tables called *tables of logarithms*.

Log'gerhead Turtle, large sea turtle (*Thalassochelys caretta*) inhabiting the tropical Atlantic and Indian oceans, so named from its large head, by which it can be readily distinguished from the green turtle. The flesh is not palatable, but the species is often brought to market. In the S. U. S. the name is often applied to the snapping turtle (*Chelydra serpentina*).

Log'ic, the science of reasoning; the art of distinguishing false reasoning from true; specifically, the science of proceeding from known to unknown data. It is denied by some writers that the processes of logic furnish any new knowledge, their conclusions being always implied in the data with which the reasoner starts. These implications, however, are generally concealed, and the logical processes serve to bring them out. Thus, to take a very simple case, a man may know that creatures that suckle their young are called mammals, and that the whale suckles its young, and may yet never have thoroughly realized that the whale is a mammal; in other words, that it is to be classed with the dog, lion, and elephant, rather than with such marine creatures as the shark, which it more resembles. The implications of the data are made clear by the *sylogism*, which is the typical form of statement in formal logic. In its simplest form it involves a *major premise*, a *minor premise*, and a *conclusion*. The major premise is a general statement (all suckling creatures are mammals). The minor premise is a particular statement (the whale is a suckling animal). The conclusion combines these two premises (the whale is a mammal). In such a simple instance as this the formal logical process seems almost childish; but in more complex ones it is able to make our ideas clearer and practically to add to our stock of knowledge. The older formal logic was largely occupied with discussions of the various kinds of syllogisms and their parts and of the different types of fallacies into which the reasoner might fall by their use. Its application to practical argumentation is often called *dialectic*.

Some of the processes involved in reasoning, and treated with more or less fullness by writers on logic are (1) *Conception*, the reaching of a notion of the abstract properties of things, such as "goodness," "beauty," and so on, and of their genera and species; that is, their kinds and subdivisions; (2) *judgment*, the act of combining or differentiating notions of this kind by assertions called in logic *propositions*, of which the *premises* of the syllogism given above are instances. Reasoning, when it proceeds, as in the instance given above, is called *deduction*, starting with a law and ending with a particular instance. The opposite process—the building up of a law from particular instances by generalization—is called *induction*, and has assumed great importance of late because it is the process used in formulating scientific laws based on the results of experiments, which are in this case the particular instances on which the induction is made. Logic recognizes two kinds of deduction, called respectively *mediate* and *immediate* inference. The latter acts by implication, as when we

infer from the statement "The cook was sober to-day" that she is usually or often intoxicated. *Mediate* inference involves a comparison of assertions, and may be *calculative* (founded on numerical relations), *subsumptive* (founded on the relations of genera and species), or *generalizing* (founded on relations of fact), which connects this kind of reasoning with the processes of induction. Reasoning by syllogism, as in the instance given above, is *subsumptive*. An interesting modern offshoot of logic is that which treats its processes symbolically, reducing them all to a kind of algebra. This was the invention of George Boole, the English logician and mathematician. See DIALECTICS.

Logis'tics, branch of the art and science of war which deals with transporting and supplying armies. It includes arranging and timing marches, preparing and transmitting orders, directing railway and water transportation, selecting and regulating camps and cantonments, as well as the manufacture, purchase, transportation, and distribution of arms, munitions, and supplies of all kinds.

Logog'raphers, name applied to the older Greek chroniclers who mark the transition from the poetical narrative of the *epos* to true historical composition. Ionia was the home of the earliest Greek prose, and most of the logographers were Asiatic Greeks. Their style was simple and inartificial; there was no organization of the material. The period of the logographers begins toward the end of the sixth century B.C., and straggling representatives of the class are found down to the time of the Peloponnesian War.

Logos (lōg'ōs), term which has a peculiar significance in Philo, St. John, and the early Greek Fathers, and is important in the doctrine of Christ. Philo, a Jewish philosopher of Alexandria (d. abt. 40), who endeavored to harmonize the Mosaic religion with Platonism, derived his Logos view from the Solomonic and later Jewish doctrine of the personified *Wisdom* and *Word* of God, and combined it with the Platonic idea of *Nous* or higher reason. The Logos is to him the embodiment of all divine powers and ideas. The Logos inherent in God contains the ideal world; the Logos emanating from God is the first-begotten Son of God, the image of God, the Creator and Preserver, the Giver of life and light, the Mediator between God and the world, also the Messiah (though only in an ideal sense—not as a concrete historical person).

St. John uses Logos (translated *Word*) four times as a designation of the divine, pre-existent person of Christ, through whom the world was made, and who became incarnate for our salvation. The idea was derived from the teaching of Christ and from the Old Testament, which makes a distinction between the hidden and the revealed being of God, which personifies the Wisdom of God and the Word of God, and ascribes the creation of the world to the Logos. The Christ-Logos is the Revealer and Interpreter of the hidden being of God, the utterance, the reflection, the visible image of God, and the organ of all his manifestations

to the world. The Logos was one in essence or nature with God, yet personally distinct from him, and in closest communion with him. In the fullness of time he assumed human nature, and wrought out in it the salvation of the race which was created through him. John, in the prologue to his Gospel, prepared the Hellenic readers who were familiar with the Philonic Logos doctrine, for the history of Jesus.

Log'wood, also called **CAMPEACHY WOOD**, red heartwood of a leguminous tree (*Hamatoxylon campechianum*), from 20 to 50 ft. in height. This tree is a native of Mexico and Central America, but is naturalized to some extent in the W. Indies. Logwood is the most important dyewood known, and is exported in great quantities. It makes many shades from black to red and lilac, according to the mordant employed. The extract or inspissated juice is largely prepared in its native countries, and is exported. In medicine, logwood is a mild astringent, from the presence of tannic acid. For use in the arts logwood is usually supplied in the form of chips, powder, or solid extract.

Lohengrin (lō'en-grin), hero of a German poem of the end of the thirteenth century, represented as the son of Parsifal and one of the guardians of the Holy Grail. Sent by King Arthur to help the Princess Elsa of Brabant, he arrives in a vehicle drawn by a swan, delivers the princess from captivity, and marries her; accompanies the emperor in a campaign against the Hungarians, and fights against the Saracens. He then returns to his bride at Cologne, but being pressed by her to state his origin, he is prevailed upon to tell it, after which he must, in terms of his vow, return home to the Grail. The legend has been made the subject of a well-known opera by Wagner.

Löher (lō'ēr), **Franz von**, 1818-92; German historian; b. Paderborn; studied law, history, science, and art; traveled in Europe, Canada, and the U. S. (1846-47); became professor at the Univ. of Göttingen, 1853, and secretary of the Academy, and professor at the Univ. of Munich, 1855; works include "Princes and Towns of the Times of the Hohenstaufens," "History of the Germans in America," "Naples and Sicily," "A Reckoning with France," "Nature and History of Alsace," and several legal works.

Loir (lwär), river of France; rises in the hills of Eure-et-Loir, flows SW., and joins the Sarthe, an affluent of the Loir, 5 m. N. of Angers, after a course of about 200 m., of which about 75 are navigable; is a river of springs, pure, deep, tranquil, and very winding; gives its name to two departments, Eure-et-Loir and Loir-et-Cher.

Loire (lwär), largest and longest river of France; rises in the Cévennes, and flows in a NW. and W. direction through the center of France to the Bay of Biscay, receiving from the right the Sarthe, and from the left the Allier, Cher, Indre, and Vienne rivers; is 620 m. in length; navigable 450 m. from its mouth;

is connected by canals with the Seine, the Saône, and the harbor of Brest; is lined with high embankments, and has a lateral canal, completed 1838, along its lower course, as it is liable to rise considerably, occasioning destructive inundations. The basin of the Loire comprises one fourth of the area of the republic, and is so fertile that it is called "the garden of France." In 1870-71 the Loire formed the boundary between the territory occupied by the Germans and those parts of France which remained unharmed by the invaders. The towns of Nantes, Tours, Blois, Orleans, and Nevers are on its banks.

Loki (lō'ki), the god of evil in the Norse mythology; is said to have taken various forms—sometimes of a woman and sometimes of one of the lower animals—in order more successfully to deceive.

Lok'man, Arabian fabulist, represented in the Koran as a contemporary of David, and by other traditions as an Ethiopian slave, deformed and witty, like Æsop, with whom he has been identified. A small collection of Arabic fables which bears his name is supposed to be of Greek origin, and to have become known to the Arabs through a Syriac version.

Lollards, name given to several religious associations in the Middle Ages. It was first used in the Netherlands abt. 1300, and was sometimes given to a religious congregation of men who devoted themselves to nursing the sick and burying the dead, and who called themselves Alexians; sometimes to the societies of the Beguins. In England it became the appellation of the followers of Wyclif. In 1394 the Lollards petitioned Parliament for a reformation of the Church, and later many suffered death. In the sixteenth century they gradually united with the Reformed churches.

Lombard, Peter (PETRUS LOMBARDUS), abt. 1100-64; Italian theologian; b. near Novara, Lombardy; taught theology and became Bishop of Paris; was one of the founders of the scholastic theology of the Middle Ages. His principal work, "Sententiarum Libri IV," from which he received the title of "Magister Sententiarum" (master of sentences), is a collection of passages from the Fathers, with accompanying commentaries, bearing on the various doctrines of Christianity.

Lombardo, Pietro, abt. 1438-1511; Italian architect and sculptor; b. either at Venice or at Carona. His first important work was the cloister of the monastery of the Benedictine monks of St. Justina in Padua, the now destroyed Church of St. Christopher in Venice, the statues of St. Anthony and St. John the Baptist, and St. Jerome in St. Stephen's Church. In 1482 Lombardo, having already erected two columns on the public place of Ravenna, the lion of St. Mark of Venice on the one, St. Apollinaris on the other, received a commission for the monument to contain the ashes of Dante. His masterpiece is the Church of Santa Maria dei Miracoli, Venice. He designed the Church of Sta. Maria Mater Domini which Sansovino completed; also the clock

tower of St. Mark's. In 1499 he became architect in chief of the Ducal Palace, and for twelve years directed all the architectural work of the republic.

Lombards (apparently from the Teutonic name meaning "long beard"), family of the Suevic or Suabian branch of the Teutonic race. According to their own legends, they had once dwelt in Scandinavia, but early emigrated to N. Germany. They first appear in history in the time of the Emperor Augustus, on the banks of the Elbe. After the final annihilation of their enemies, the Heruli and Gepidæ, they crossed the Julian Alps under their victorious king Alboin, and in N. Italy founded, 568, a powerful state, with feudal institutions. Their kingdom lasted more than 200 years, their most remarkable monarchs being Authari, who embraced Christianity; Rotharii, author of a code of written laws (643); Grimoald, who reformed the laws of the preceding; Luitprand, the conqueror of Ravenna (728); Aistulf, who attempted the conquest of Rome; and Desiderius, with whom the kingdom ended, being conquered by Charlemagne, 774. Under the successors of the latter the Lombard cities, with Milan at their head, grew prosperous and powerful, and adopted republican institutions.

After a long struggle with the emperors, in the course of which they united into a league, they became independent by the Treaty of Constance, 1183. The Visconti soon preponderated in Milan, of which city Giovanni Galeazzo Visconti became duke, 1395, with an extensive territory. His daughter Valentina married Louis, Duke of Orleans, whence arose at the close of the fifteenth century a claim on the part of France to the duchy. Charles V supported Francesco Sforza against the French, and, 1540, after his death, bestowed Milan as a vacant fief of the empire on his son Philip. It remained a Spanish possession till 1706, when it was conquered by the Austrians. In 1796 Bonaparte conquered Lombardy, and it became successively a part of the Cisalpine republic, of the Italian republic (1801), and of the kingdom of Italy (1805). It was restored to Austria, 1815, and united with Venice as the Lombardo-Venetian kingdom of the Austrian Empire. By the Treaty of Zurich, November 10, 1859, Lombardy passed to Victor Emanuel, excepting Mantua and Peschiera, which he received under the Treaty of Vienna of 1866.

LOMBARDS, name also given during the Middle Ages to a vast number of shrewd and intelligent Italians, principally from Lombardy, who abounded in London and Paris during the twelfth century. They were principally brokers, bankers, and usurers, who advanced money on all kinds of securities. Lombard Street in London derived its name from them, and there is in Paris another, once entirely occupied by Lombards, which bears the same designation. That of London still is to Great Britain what the Lombard Street of Paris was to France, the financial center of the country. Both in France and England the Lombards were regarded, though in less degree, like the Jews, as a despised race, and were accordingly oppressed by the sovereigns of those countries.

Lom'bardy, territory of N. Italy; extending from the Alps to the Po, and from Lago Maggiore and the Ticino, which separate it from Piedmont, to Lago di Garda and the Mincio, which separate it from Venetia. It consists of an alpine region to the N. covered with picturesque mountain ranges and containing beautiful valleys, and a large and exceedingly fertile plain to the S., extending along the Po, and watered by the Ticino, Lambro, Adda, Oglio, and Mincio. This plain, with its rich soil and mild climate, is one of the most fertile and most prosperous parts of the Kingdom of Italy. The principal industry is dairy farming; principal manufacture, silk. The territory, comprising an area of 9,297 sq. m., with a population est. (1908) at 4,543,738, does not now form a political unit, but is divided into the provinces of Bergamo, Brescia, Como, Cremona, Mantova, Milano, Pavia, and Sondrio. It received its name from the Lombards.

Lombok, one of the group of the Sunda Islands; in the Malay Archipelago; between Bali and Sumbawa; belonging to the Netherlands; area, 2,100 sq. m.; pop. abt. 325,000, mostly indigenous Mohammedans. Its coasts are mountainous, containing several active volcanoes. Rice and cotton are extensively cultivated. The capital is Mataram; seaport, Ampanam.

Lom'briz, term used in the S. and W. parts of the U. S., including the territories, meaning a disease of sheep and goats caused by the presence of a small worm (*Strongylus contortus*). This parasite is of a reddish color, about a tenth of an inch long, and attaches itself to the mucous membrane of the fourth stomach. When present in large numbers the worms cause diarrhea, anemia, weakness, and death.

Lombroso (lōm-brō'zō), Cesare, 1836-1909; Italian criminologist and alienist; b. Venice; entered the army in the campaign of 1859 as a soldier, but was soon made surgeon; became Prof. of Diseases of the Mind in the Univ. of Pavia, 1862, and later director of an establishment for the insane at Pesaro, from which place he went to the Univ. of Turin as Prof. of Medical Law and of Psychiatry. His theory of criminality is fatalistic, and regards the criminal as chiefly the result of atavism, or the result of heredity and climatic environment. His most important works are, "The Criminal, an Anthropological and Medico-legal Study," "The Man of Genius," "Anthrometry of Four Hundred Criminals," "Epileptic Insanity," "Crime, its Causes and Remedies," "The Physiognomy of the Anarchist," "The Male Criminal," "The Female Offender."

Loménie (lō-mā-nē'), Louis Léonard de, 1815-78; French author; b. St.-Yrieix, Haute-Vienne; wrote for the *Revue des Deux-Mondes* and *La Patrie* of Paris; published there, "Gallery of Contemporary Illustrious People"; Prof. in French Literature, Collège de France, 1845-64, and at the École Polytechnique after 1864; works include "Beaumarchais and his Times," "The Countess of Rochefort and her

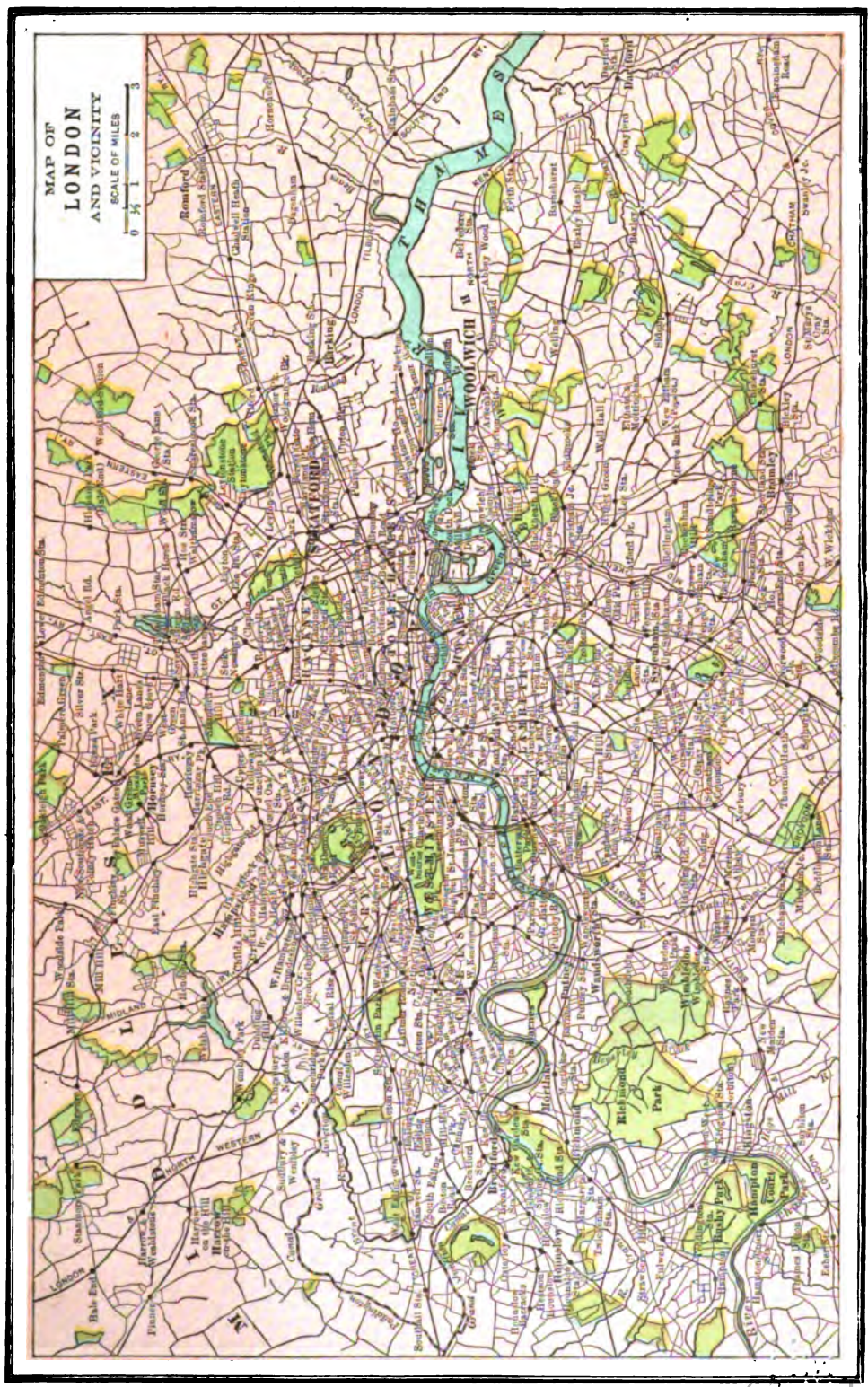
Friends," "Historical and Literary Sketches." He was elected to the Academy, 1871.

Lo'mond, Loch. See **LOCH LOMOND.**

Lomonosov (lō-mō-nōs'ōv), **Mikhail Vasilovich**, 1711-62; Russian author; surnamed the "Peter the Great of Russian Literature"; b. at or near Kolmogory, government of Archangel; son of a poor fisherman; became Prof. of Chemistry, 1746, and rector, 1760, in the gymnasium and Univ. of St. Petersburg; author of the beginnings of a history of Russia, a Russian grammar, several orations, an unfinished epic, and a number of short poems.

Lon'don, the metropolis of Great Britain, situated on both sides of the Thames, 60 m. from its mouth. Its size is somewhat indefinite. The postal district covers an area of 250 sq. m. The city of London within municipal and parliamentary limits covers an area of about 673 acres; the Metropolitan Police district, not including city, covers an area of 442,746 acres, making a total of 443,419 acres, with a pop. (1911) of 7,252,963. The parliamentary London consists of ten boroughs, of which the city of London, although the smallest, is represented by four members, on account of its commercial and financial importance, while each of the other nine, although larger, is represented only by two: Westminster, Chelsea, Marylebone, Hackney, Finsbury, Tower Hamlets, Lambeth, Southwark, Greenwich. Generally the size of the city is determined by the area under the operation of the Metropolitan Local Government Act, which is also adopted by the registrar general for the census. According to this definition, the Registration County of London covers an area of 74,839 acres, with 4,522,961 inhabitants in 1911.

In its course through the city the width of the Thames varies from 700 to 1,200 ft. It is spanned by a great number of magnificent bridges, of which the most remarkable are London Bridge, 900 ft. long, of stone, daily crossed by 25,000 vehicles; Waterloo Bridge, 1,240 ft. long, consisting of nine elliptical arches; Westminster Bridge, 1,200 ft. long, consisting of seven iron arches resting on stone piers, etc. Several tunnels under the river connect the two banks—the Thames Tunnel, 2 m. below London Bridge; the Thames Subway, carried 25 ft. below the bed of the river. There are also several electric railway tunnels, which are 50 to 60 ft. below the surface. The whole number of passengers using the railways in and about London may be computed at 520,000,000 annually. At London Bridge the Thames has sufficient water to admit vessels of 800 tons, and between this point and Bigsby's Hole, 6½ m. farther down, opposite Blackwall, extends the port of London, with its twenty-eight magnificent wet docks. Shipbuilding yards are situated opposite Greenwich. Of other manufactures carried on to a remarkable extent are those of silk, employing about 100,000 persons; clocks, watches, carriages, jewelry, gold and silver ware, etc.; enormous breweries and sugar refineries are in operation. The manufacturing activity of the city is chiefly carried on in the districts S. of the



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river; that of carriages, however, is concentrated at Long Acre. The commerce and regular business are carried on in that part of the city which is distinctively called the City of London, situated on the N. bank of the river, and forming the center of the whole hive; it has its own police, and is said to be entered every morning by 700,000 persons, who leave it again in the evening.

The principal thoroughfares run from E. to W., parallel with the river. The W. part is the seat of most of the public institutions and the residence of the wealthy and aristocratic classes. A prominent feature in the prospect of the city are the Thames embankments or river quays. Of the squares, of which a great number are scattered all over the city, and many of which are planted with beautiful trees and are well cultivated, the largest are: Eaton, 1,637 by 371 ft.; Cadogan, 1,450 by 370; Bryanston, 814 by 198; and Montagu Square, 820 by 156; the most fashionable are Belgrave, Grosvenor, St. James's, Hanover, Cavendish, and Trafalgar squares, with the Nelson Column, the statues of Havelock and Napier, and fine fountains; the most crowded, because situated in the E. quarters and mostly surrounded by lodging houses, are Great Ormond, Queen, Brunswick, and Mecklenburg squares. Of the public parks the most prominent is Hyde Park, comprising an area of about 400 acres between Green Park and Kensington Gardens, and containing a fine sheet of water, the Serpentine; an excellent drive, Rotten Row (*route du roi*), from Apsley House to Kensington Gardens; and the splendid Albert monument, erected on the site of the Crystal Palace of 1851. Remarkable among the other parks are the Regent's Park, comprising 450 acres and containing a botanical garden and the Zoological Gardens, having the largest and most complete collection of living animals in the world; St. James's (59 acres), extending between St. James's Palace, Buckingham Palace, and the Wellington Barracks; Green Park (60 acres), between Hyde Park and Piccadilly, from which it is entered through a triumphal arch surmounted by an equestrian statue of Wellington; Victoria Park (300 acres), in the NE. part of the city; Kensington Gardens, a beautiful piece of ground separated from Hyde Park by the Serpentine; the Kew Botanical Gardens (170 acres), 5 m. from Hyde Park on the road to Richmond, etc.

The citadel of London, the Tower, is perhaps the most interesting and most widely known of its public buildings. It is situated at the E. extremity of the city, and consists of a bewildering mass of towers, forts, batteries, ramparts, barracks, and storehouses, covering an area of 900 ft. by 800. As a fortress the Tower is not of great consequence, but it contains vast stores of war materials. Of the royal palaces, none is very remarkable; they are more distinguished for vastness of dimensions than for elegance of architecture—viz., Buckingham Palace, Kensington Palace, St. James's, and Marlborough House. The new Westminster Palace, or the houses of Parliament, stands on the left bank of the Thames, between the river and Westminster Abbey, on

the site of the old palace, which was destroyed by fire, 1834. It is a vast construction, covering an area of 8 acres, containing 2 m. of corridors, 100 staircases, and 1,100 apartments.

Next to the Tower in historical interest, and far superior to it in architectural respects, is Westminster Abbey. The oldest parts of the present building, the choir and the transepts, were erected in the thirteenth century by Henry III; the nave and the aisles, in the fourteenth and fifteenth centuries by the abbots; the W. front and the great window, by Richard III; the famous chapel at the E. extremity, by Henry VII, who also completed the interior; and the upper part of the W. towers, by Wren. The present structure is 511 ft. long, 203 across the transepts, 79 across the nave and aisles; the height of the nave is 102 ft.; of the towers, 225. From the time of Edward the Confessor the kings of England have been crowned here, and most of them, after Henry VII, lie buried or have their monuments here! An interesting spot of the building is called "Poets' Corner," in the E. aisle of the S. transept, in which the most illustrious men of English science, literature, and art are buried or have their monuments. There are some 850 places of worship belonging to the Church of England in the London districts. The cathedral of the See of London is the Church of St. Paul, built by Wren between 1675 and 1710. It is 500 ft. long, 180 wide, 222 high; the height of the dome is 365 ft.; the diameter, 145. It is the fifth largest church in Europe. The oldest church of London is St. Bartholomew the Great, W. Smithfield, built in 1102 and restored 1861-67.

London has a large number of hospitals and over 1,000 charitable institutions, with an annual income of about £5,000,000, half of which is disbursed for food and clothing alone. By the Elementary Education Act of 1870 the city was divided into ten school districts, represented in the central school board by forty-nine members. This board is authorized to provide new schools and compel the attendance of children between five and twelve years of age. First among all educational institutes of London stands the British Museum, but the city has beside about fifty large libraries accessible to the public, excellent collections illustrative of industry and art in the Kensington Museum, the National Gallery of Paintings of all schools in Trafalgar Square, and many private collections.

London, capital of Middlesex Co., Ont., Canada; at the junction of the N. and S. branches of the Thames River; 61 m. E. of Sarnia. The site was selected, 1793, by Gov. Simcoe for a city to become the capital of Canada, but the home government never recognized the choice, and no attempt was made to improve it till 1826, when the first building was erected. The city is in a fertile, cultivated region, is laid out with wide intersecting streets, and many of its public buildings, bridges, streets, squares, and markets, and its public park, are named after those in London, England. It is the seat of the Anglican bishopric of Huron and of a Roman Catholic bishopric, and contains two cathedrals, Hellmuth Ladies' College, Huron

College, Western Univ., a normal school, a mercantile college, orphan asylum, hospital, insane asylum, and several libraries. The industries include the manufacture of furniture, agricultural implements, engines, machinery, railway cars, oil, chemicals, boots and shoes, cigars, tobacco, stoves, and pottery. Pop. (1911) 9,785.

Londonderry, Charles William Stewart Vane (third Marquis of), 1778-1854; British soldier and statesman; b. Dublin, Ireland; served on the Continent both as a soldier and a diplomatist during the wars of the French Revolution; aided in suppressing the Irish Rebellion of 1798; accompanied Abercrombie to Egypt, 1801, in which year he entered Parliament; became colonel, aid-de-camp to the king, and Under Secretary for the War Department, 1803; led a brigade of hussars under Sir John Moore in Spain, 1808-9; was adjutant general to Sir Arthur Wellesley, 1809-13, distinguishing himself at Talavera and other battles, for which he received the thanks of Parliament and the Order of the Bath; went as ambassador to Berlin, 1813; to Austria, 1814, and was a member of the Congress of Vienna, 1815; made Privy Councillor, lieutenant general, and Baron Stewart, 1814; assumed the surname of Vane, 1819, on his marriage with the heiress of that title; succeeded his half brother, Robert, as Marquis of Londonderry, 1822; made Earl Vane and Viscount Seaham, 1823; general, 1837; Knight of the Garter, 1852. Under his original name of Stewart he was author of a "History of the Peninsular War," and as Marquis of Londonderry edited the "Correspondence" of his brother, Lord Castlereagh.

Londonderry, Robert (second Marquis of). See CASTLEREAGH.

Londonderry, capital of Londonderry Co., Ireland; on the Foyle, here crossed by an iron bridge 1,200 ft. long; 120 m. from Dublin; is built on a hill, on whose top stands the Cathedral of Derry, and was formerly fortified; has many breweries and distilleries, and considerable manufactures of linen and ropes. Derry was the old name of the city, but in the reign of James I the resistance of its inhabitants to the royal authority caused the forfeiture of the land on which it stood to the Crown, and its government was then administered by the Irish Society in London, which rebuilt the city and gave it its present name. In the revolution of 1688 it sided with William of Orange, and sustained a memorable defense against the forces of James II. Under its governor, George Walker, it held out against the besiegers for 105 days, enduring the extremes of privation until a man-of-war brought relief and the siege was raised. Pop. (1901) 39,892.

London, University of, institution of learning in London, England, which owes its origin to an agitation started in 1825 by the poet Thomas Campbell for a university of equal rank with Oxford and Cambridge, which should be free from denominational control. The university was incorporated, 1826, and the cornerstone of University College was laid, 1827, but the fact that the new institution made no provision for instruction in religion caused seri-

ous thought, which resulted in King's College, founded 1829, opened 1831, in which provision was made for teaching religion according to the forms of the Church of England. In 1837 the University of London was incorporated by royal letters patent as an examining body pure and simple, with which King's and University colleges were affiliated; 1878, women were admitted to all degrees and prizes; and 1900 the university was reorganized so as to be a teaching as well as an examining body. In 1908 there were twenty-nine colleges or schools giving instruction in nine faculties. In 1906 the university had over ninety examiners for external students, and over 10,500 candidates entered the various examinations.

Long, Crawford W., 1815-78; American physician; b. Danielsville, Ga.; claimed that he performed, March 30, 1842, the first surgical operation with the patient in a state of anæsthesia from the inhalation of ether; was named, with William T. G. Morton, Charles T. Jackson, and Horace Wells, in a bill before the U. S. Senate, 1854, to reward the probable discoverers of practical anæsthesia; was credited by Dr. J. Marion Sims with antedating Morton and Wells in producing anæsthesia for surgical purposes.

Long, George, 1800-78; English scholar; b. Poulton, Lancashire; was Prof. of Ancient Languages in the Univ. of Virginia, 1824-26, and of Greek in London Univ., 1826-31; editor of the Penny Cyclopædia, 1832-43; Prof. of Latin in University College, 1842-46, and of Classical Literature in Brighton College, 1849-71; was general editor of a "Bibliotheca Classica" published "France and Its Revolutions," "Geography of England and Wales," "Geography of America," a "Classical Atlas," and "Decline of the Roman Republic."

Long, Roger, abt. 1680-1770; English clergyman and astronomer; b. Norfolk Co., England; became vice chancellor of the Univ. of Cambridge, 1729; master of Pembroke Hall, 1733; Prof. of Astronomy, 1749; and rector of Bradwell, Essex, 1751; invented the uranium, a machine for facilitating the study of astronomy; most important work, "Treatise on Astronomy."

Long Branch, city in Monmouth Co., N. J.; on the Atlantic Ocean; 11 m. S. of Sandy Hook, 30 m. S. of New York; was formerly a fishery for the Indians and a resort for wreckers, but is one of the oldest and most noted summer resorts in the U. S.; is easy of access from New York and Philadelphia, and during the summer has almost hourly communication with the former by rail and water and with the latter by rail. The city is famous for its magnificent beach, which extends nearly 5 m. within corporate limits, and is overlooked by a bluff averaging 20 ft. in height. The main thoroughfare is Ocean Avenue, which skirts the bluff for about 4 m., and is kept in excellent condition. The city is connected by trolley lines with Asbury Park, Belmar, Ocean Grove, Pleasure Bay, and other noteworthy resorts. Pop. (1910) 13,298.

Longevity, length of time during which the different species of living beings live. The average longevity of a particular group of individuals is the average duration of life of all the individuals in that group; that is what is called the expectation of life at birth, and is usually considered in connection with the subject of mortality. Potential longevity is the greatest length of life attained by any individual of a particular group. This again is divided by Ray Lankester into "normal potential longevity," or that which belongs to the species in its normal conditions, and "absolute potential longevity," or that which can be obtained for a few individuals under special and unusual conditions. The distinction is useful as applied to plants and the lower animals, but is not of much importance as applied to man. The longevity, whether average or potential, of different species of living beings varies greatly, the range being from a few hours or days for certain minute plants or complete forms of insects to two thousand years and more for a few individual yews and baobabs.

The patriarchs before the flood, with the exception of Enoch, are all represented in the Bible to have lived seven or eight centuries. Commentators who reject the literal interpretation suppose either that the name of each patriarch denotes a clan or family instead of an individual, or that the sacred biographies are allegorical. History shows that the natural term of life has varied little during four thousand years, and the proportion of extraordinary cases of longevity continues much the same as it was in former times. Sophocles is said to have lived ninety years; Zeno, ninety-eight; Democritus, ninety-nine; Pyrrho, ninety; Diogenes, ninety; Isocrates, ninety-eight; Gorgias and Hippocrates, upward of one hundred.

The greatest age ever attained by a human being in an authenticated case is that of a man named Rives, who was living at Tarbes, France, in June, 1888, and whose baptismal certificate stated that he was born in August, 1770, thus making him to be about one hundred and eighteen years old. The claims that Thomas Parr reached the age of one hundred and fifty-two, the Countess of Desmond one hundred and forty-five, and other similar cases are unsupported by satisfactory evidence, and there is no proof that any one in England or the U. S. has ever reached the age of one hundred and ten years, but there are several well-authenticated cases in which it has been between one hundred and one hundred and eight years. There is no reason to suppose that the potential longevity of man has diminished since he first appeared upon the earth.

Of animals, the elephant is said to have lived in captivity one hundred and thirty years, and the E. Indians believe that it lives about three hundred years. Camels live from forty to fifty years, horses from twenty-five to thirty, oxen about twenty, sheep eight or nine, and dogs from twelve to fourteen years. As a general rule, the larger types of animals live longer than the smaller, in the vertebrate classes, quadrupeds, birds, reptiles, and fishes. The swan has been known to live one hundred

years, and the raven and eagle have exceeded that age. Parrots have been known to live eighty years. Pheasants and domestic poultry rarely exceed twelve or fifteen years. Reptiles of some kinds live very long. Fishes, and animals that live in the water, attain in many instances a great age. The carp has been known to live two hundred years, and the whale is supposed to reach in some cases the age of four hundred. Some plants and trees run their career in a year or two, as the families of annual and biennial plants, while a few species of the larger growth of trees live centuries, and even tens of centuries. The Oriental plane, the baobab, the chestnut tree, the great sequoia of California, and the deciduous cypress are said to attain four thousand or five thousand years or more. Adanson found baobab trees in Africa which he computed to be five thousand one hundred and fifty years of age; and the younger De Candolle reports the deciduous cypress of Chapultepec, Mexico, to be still older. The famous sweet chestnut trees on Mt. Ætna are said to be as old as the baobabs just mentioned; and the Oriental plane tree in the valley of Buyukdere, near Constantinople, having a girth of 150 ft. and an internal cavity 80 ft. in circumference, is deemed as old as any other tree existing.

Longfellow, Henry Wadsworth, 1807-82; American poet; b. at Portland, Me.; entered Bowdoin College at fourteen, and graduated, 1825, in a class which included Nathaniel Hawthorne and several other persons afterwards known in literature. During his college days he wrote several short poems; one, the "Hymn of the Moravian Nuns"; after graduation he entered the law office of his father, but in the following year accepted the professorship of modern languages at Bowdoin, with the privilege of spending three years in Europe in preparation for that post. After studying in France, Spain, Italy, and Germany, he entered upon his professorship, 1829, and began to publish the results of his researches into European languages and literature. His first volume was an "Essay on the Moral and Devotional Poetry of Spain" (1833), which included translations of the "Coplas de Manrique" and of several sonnets of Lope de Vega. A volume of prose sketches of travel appeared, 1835, under the title "Outre-Mer: a Pilgrimage Beyond the Sea," and numerous essays and critiques on literary topics were contributed to the *North American Review*. In 1835 he was elected to the Chair of Modern Languages and Literature at Harvard, and spent a year in European travel and study, especially in Denmark, Sweden, and Switzerland. Entering upon his professorship in 1836, he soon became a resident in the historic Craigie House (Washington's headquarters), which he afterwards purchased and made his home. In 1839 he published "Hyperion, a Romance," and "Voices of the Night," his first volume of original verse, comprising the selected productions of nearly twenty years; it procured him immediate recognition as a poet, and the "Psalm of Life" took rank as a popular favorite. Ballads and other poems and a small volume of "Poems on Slavery" appeared, 1842; "The

Spanish Student," 1843; "The Belfry of Bruges," 1846; "Evangeline, a Tale of Acadie," 1847. In 1845 he put forth "The Poets and Poetry of Europe"; 1849, "Kavanagh, a Tale," in idyllic prose; 1850, "The Seaside and the Fireside"; 1851, "The Golden Legend"; 1855, "The Song of Hiawatha"; 1858, "The Courtship of Miles Standish"; 1863, "Tales of a Wayside Inn"; 1866, "Flower de Luce"; 1867-70, a translation of Dante; 1869, "New England Tragedies"; 1871, "The Divine Tragedy"; 1872, "Three Books of Song"; 1874, "The Hanging of the Crane," and, 1875, "Mortuiri Salutamus," a poem read at the fiftieth anniversary of his class at Bowdoin College. He resigned his chair at Harvard in 1854, but continued to reside at Cambridge; he traveled in Europe in 1841-42 and 1868-69, on which latter occasion he received the degree of D.C.L. from the Univ. of Oxford, and in 1874 received a large complimentary vote for the lord readership of the Univ. of Edinburgh.

Longfellow, Samuel, 1819-92; American clergyman and hymnologist; b. Portland, Me.; brother of the preceding; held several Unitarian pastorates; compiled "A Book of Hymns" (with Rev. Samuel Johnson), afterwards revised as "Hymns of the Spirit"; "Hymns and Tunes for Congregational Use"; a small volume for the vesper service; edited a life of Samuel Johnson and one of his brother Henry; published "A Few Verses of Many Years," and a number of essays and sermons.

Longhi (lón'gè), Giuseppe, 1766-1831; Italian engraver; b. Monza; was several years head of the Milan School of Engraving; worked after Rembrandt, Rubens, Crespi, Gherardo dalle Notti, Raphael, Correggio; most famous plates include "Jesus in the Arms of St. Joseph," the "Marriage of the Virgin," a "Holy Family," after Raphael, and portraits of Napoleon, Michelangelo, the Doge Dandolo, George Washington, and the artist's brother. Bonaparte commissioned him to engrave certain pictures by Appiani of Napoleonic ceremonies while he was at Milan, of which, he executed five.

Longinus, Dionysius Cassius, abt. 213-273; Greek critic; b. Athens; opened a school of philosophy, criticism, and rhetoric, and subsequently became the literary instructor and chief counselor of Zenobia, Queen of Palmyra. He encouraged her to throw off the Roman yoke, and on the capture of Palmyra was put to death by order of the Emperor Aurelian. He was the ablest philosophical writer of his age.

Long Island, narrow, fish-shaped strip of land, the extreme SE. portion of the State of New York, extending along the mainland from the mouth of the Hudson River nearly to the E. boundary of Connecticut, being separated from the mainland on the N. by Long Island Sound, and washed on S. by the ocean. Its greatest length from W. to E. is 115 m., and its average breadth from N. to S. 12 m. The resemblance to a fish extends to the bilobed tail; the S., which is the longer lobe, ends in Montauk Point, the N. in Orient

Point. Between them lies Peconic Bay. The total area of the island is 1,682 sq. m., and its population beyond 1,750,000, of which $\frac{1}{4}$ are within the limits of the former city of Brooklyn. Along the N. shore there is a narrow range of hills called the "backbone" of the island, but the rest of the surface slopes gradually to the ocean. The S. shore is one immense sand bank, called the Great S. Beach, nowhere more than 5 m. wide, and separated from the island proper for nearly its entire length by inlets from the ocean. The largest of these inlets is the Great S. Bay, which extends for 60 m. without a break behind the Great S. Beach. Rockaway and Coney Island beaches, which have become famous summer resorts, owing to their proximity to New York, are W. extensions of the Great S. Beach. The island is divided into the four counties of Kings, Queens, Nassau, and Suffolk. Kings and Queens counties constitutes two boroughs of New York City.

The island was visited, 1609, by Hendrick Hudson, who probably touched at Coney Island. It was included in the grant, 1620, by James I to the Plymouth Company of all the land between 40° and 48° N. lat. between the Atlantic and Pacific oceans. The company granted a patent of the island to Lord Starling, who died, 1640, and the same year his son surrendered the patent to the Duke of York. Settlements began at the E. and W. ends about the same time—at Gowanus (Brooklyn), 1636; Gardiner's Island, Southold, and Southampton, 1639-40; Hempstead, in Queens Co., 1643. The island was at that time occupied by thirteen tribes of Indians, all having the same general characteristics and habits. The battle of Long Island was fought over the ground now occupied by Brooklyn, August 26, 27, and 28, 1776, and the island suffered greatly by incursions from the mainland, from British vessels, and by its occupation by foreign troops.

Long Island, or Out'er Hebrides (hèb'ri-déz), group of the Hebrides, Scotland, embracing Lewis, Harris, N. and S. Uist, Benbecula, Barra, and a number of small islands, all of which are supposed to have been formerly united; length, about 130 m.

Long Island Cit'y, former city and one of the capitals of Queens Co., N. Y.; now a part of Queens Borough, New York City; is opposite that part of Manhattan Borough which extends from Thirty-second Street to Mott Haven, Blackwell's Island lying between; is separated from Brooklyn Borough by Newtown Creek; has a water front of over 10 m., and an area of about 8 sq. m., and comprises the former villages of Hunter's Point, Ravenswood, Dutch Kills, Blissville, and Astoria.

Long Island Sound, body of water between Long Island and the mainland of New York and Connecticut; about 110 m. long and from 3 to 20 m. wide; is connected with the Atlantic on the W. by the East River, New York Bay, and the Narrows, and on the E. by a narrow passage called the Race. The principal rivers entering it are the Naugatuck, Connecticut, Housatonic, and Thames.

Long'itude, in geography, an arc of the equator included between the meridian of a place and the meridian whence the degrees are counted, which is usually called the first meridian. The ancient geographers drew the first meridian through Ferro, the extreme W. of the Canary Islands, and they are still followed by the geographers of Germany and E. Europe (who draw it, however, a little E. of the island). The English call the first meridian that which passes through Greenwich; the French, that of Paris; the Spaniards, that of Madrid. The inhabitants of the U. S. generally use Greenwich, though the longitude from Washington is also used. Almost every method of determining the longitude depends on obtaining the difference of time between your first meridian and that which passes through the place where you are. John Werner was the first to recommend the use of lunar distances for this purpose (1514); but at that time there were neither lunar tables nor instruments for measuring the distance between the moon and a star. Gemma Frixius was the first to suggest the use of timekeepers (1530), but the art of watch making was then in its infancy.

Since then chronometers have been made practically accurate, and the simplest method is that of transferring chronometers from one place to another. Thus, suppose two observers at the distant stations A and B each to regulate his clock to the true sidereal time of his station, that is, reckoned by the stars; and suppose a chronometer, also regulated to true sidereal time, to be compared with the clock at A and then transported to B. The difference of the two clocks would thus be seen, which difference is exactly the time occupied by any star in passing from the meridian of A to that of B; or it is the difference of longitude of the two stations, expressed in sidereal hours, minutes, and seconds. If chronometers were perfect, this method would be perfect.

Of all methods of determining differences of longitude, that by telegraphic signals, especially over long lines, is the most precise. The following is the simplest form of the method. If the local time of pressing on the key at the first station and of the click at the second station (supposed to be produced instantly) be observed, the difference of those local times is the difference of longitude. It takes a few thousandths of a second for the signal to travel to a distant station, and a few thousandths of a second to make the click, so that if the second station is W. of the first the resulting difference of longitude is too small by these small quantities; but if, retaining the same adjustments and equal battery strength, signals be sent from W. to E., the resulting longitude will be as much too large, and the mean of the two values will be correct.

Longobar'di. See **LOMBARDS.**

Long Par'liament, name given to the fifth Parliament of Charles I's reign in England, summoned November 3, 1640, and continued throughout the period of the civil war. See **CHARLES I;** **CROMWELL, OLIVER.**

Long's Peak, one of the highest summits of the Rocky Mountains; in Colorado; 14,271 ft. high; named after Stephen H. Long.

Long's street, James, 1821-1904; American army officer; b. Edgefield District, S. C.; graduated at West Point, 1842; served through the Mexican War; on frontier duty in Texas, 1847-52; became paymaster and major, 1858; resigned to enter the Confederate army, June, 1861. In the following month he commanded a brigade at Bull Run. In 1862 he was promoted to major general; fought the battle of Williamsburg (May 5th); bore the brunt of the battle of Seven Pines (May 31st); was engaged at Cold Harbor (June 27th) and Frazier's Farm (June 30th); given command of a corps and at second Bull Run joined Jackson (August 30th) in time to secure the victory; was conspicuous at South Mountain, Antietam, and Fredericksburg, commanding the Confederate right and the left wing and center respectively in the two last battles. In 1863 he was promoted to lieutenant general; arrived in Tennessee in time to secure the Confederate success of Chickamauga (September 19th, 20th); and was unsuccessful in his operations against Burnside near Knoxville. He rejoined Lee, March, 1864; was severely wounded by his own men in the battle of the Wilderness (May 6th); and after returning to the army commanded the defenses of Richmond N. of the James. After the war he was collector of customs at New Orleans; minister to Turkey, 1880-81; U. S. marshal for the District of Georgia, 1881-84; and U. S. commissioner of railroads from 1898 till death.

Longueville (lông-vêl'), Anne Geneviève de Bourbon-Condé (Duchess de), 1619-79; French politician; b. Vincennes; married the Duc de Longueville, 1642; was drawn into political life by influence of the Duc de la Rochefoucauld; shared hatred of Mazarin; sided with Parliament; held the Hotel de Ville during the insurrection in Paris, which she aided by direction and advice; consented to peace with Mazarin; on imprisonment of her husband and brother, fled to Stenay; induced Turenne to turn traitor to the court; and forced the government to release the prisoners. After a brief interval of apparent reconciliation, she was again in revolt, aiding actively in the defense of Bordeaux, but her party was hopelessly divided in its counsels and was soon overthrown. After peace was made, 1659, she ceased to meddle in politics, and became a religious devotee.

Lon'gus, Greek Sophist of the fourth or fifth century of our era, but of whose personal life nothing is known; was the author of the pastoral romance of "Daphnis and Chloe," which has come down to us; first printed at Florence, 1598.

Lönnrot (lön'röt), Elias, 1802-84; Finnish philologist; b. Sammatti; was successively a tailor, druggist, and physician; became Prof. of the Finnish Language and Literature at the Univ. of Helsingfors, 1853; rendered great service to linguistic science in general, but made the Finnish a literary language, displaying

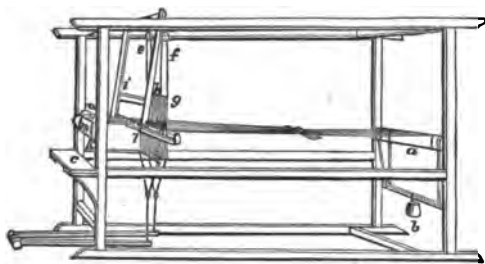
ing an individual civilization. Traveling on foot from the Gulf of Finland to the White Sea, he gathered the songs and tales which lived among the Finns without ever having been written down, and the results were the "Kalevala," the "Kanteletar," and two large collections of proverbs and enigmas. He also compiled a Swedish-German-French dictionary, and wrote a number of essays on subjects relating to the Finnish, Lappish, and kindred languages.

Lons-le-Saulnier (lôn-lê-sôn-yâ'), town in department of Jura, France; at the confluence of the Seille, Vallière, and Solman. Its famous salt works have been converted into mineral baths. An important industry is the manufacture of sparkling wines. Pop. (1901) 10,306.

Loo Choo Is'lands. See RIU KIU ISLANDS.

Look'out Moun'tain, historic point on the range of mountains in NW. Georgia and the adjacent parts of Alabama and Tennessee; 1,600 ft. above the Tennessee River; noted as the scene of a remarkable part of the battle of Chattanooga during the Civil War. On November 24, 1863, the Union army under Gen. Hooker scaled the almost precipitous N. face of the mountain, surprised and dislodged the Confederates under Gen. Bragg, and forced a retreat after severe fighting. This engagement has been called "The Battle Above the Clouds," as the mountain was enveloped in a heavy mist during the struggle.

Loom, machine by which weaving is effected. In its simpler forms it is probably one of the earliest of human inventions. The object of weaving is the making of cloth by the intersection of materials. The portions running lengthwise are called the warp, or chain, and those across, the woof or weft. The framework



LOOM.

consists of four uprights, with three horizontal beams at the top, center, and base. At one end is the beam or yard roll (a) on which the threads of the warp are wound, passing through the heald, a sort of comb (l); and extending to the cloth beam or breast roll (m) at the other extremity of the loom. Round the latter the fabric is rolled as it is woven. It is kept tight by weights suspended from the yard roll (b). The treadles (d) are pressed by the feet; one is connected with the harness or heddle (e) and the other with h, g, f. The alternate depression and elevation of the treadle causes a corresponding movement in the harness to which it is attached. The harnesses

are each formed of two horizontal bars, connected by many small cords of varying lengths, and united by a rope and pulley, so that the depression of the one necessitates the elevation of the other. Where the harnesses are intersected by the warp (o) there are loops or metallic eyes.

Each separate thread is passed through the cords of one or other of the harnesses in regular order, so that the alternate warp threads go through the loops of one heddle, while the intermediate threads are passed through the cords of the one and the loops of the other harness. When the treadle action lowers one harness, all the warp threads passing through its loops will be depressed while the other harness, with all the intermediate threads, will by the same motion be raised, thus leaving between the two divisions a space for the passage of the shuttle, which carries the thread of the weft. - As soon as it passes the action is reversed. The reed (i), sometimes made of small portions of split reed, but usually of flattened wires, drives the threads tightly after each intersection. The wires are fixed like comb teeth in a frame which rests upon the shuttle race, the warp thread passing through the interstices. At the top is a cover with a groove along its lower side, known as the lay-cap. The weaver's seat (c), being hung by rounded ends, accommodates itself to the various movements of the body required by the various operations described. The movement of the batten is produced by the hand of the weaver. Such is a description of the simplest form of loom, and the highly complex machines now employed are identical in principle. One great difference between the hand loom and the power loom is the mechanical arrangement by which the shuttle is thrown in the latter. At each side of the loom, and in a line with the shed, is a groove. Along these shuttle races the shuttle flashes, impelled by a leather and strap arrangement acting on the principle of a sling. The warp unwinding from a beam passes round a roller above it, passes through the two leaves of the heddles, thus forming the shed through which the shuttle flies, the weft is then pressed up by the batten, and the finished cloth results.

In weaving figured fabrics two persons were formerly necessary. In 1779 William Cheape patented a mechanical "drawboy," as the assistant was called. This, with sundry improvements, continued in use until it was superseded by the famous Jacquard machine. The Jacquard frame can be adapted to nearly all looms. The warp threads are passed through loops in the lifting threads so as to be raised by the action of the treadles upon the lifting bars; the lifting threads hang on wires terminating in a hook. Each wire passes through a horizontal needle at right angles. It moves freely through at one side, and at the other extremity is looped on to another rod ending in a spring box. When pushed back into this box it presses upon a spiral spring, which restores it to its former position immediately the pressure ceases. When pressure is exerted upon any wire it is thrown out of the perpendicular, and so fails to catch upon the

projection in the lifting bar; the wires not so acted upon reach the bar, drawing the threads of the warp attached to them. It will be evident from this that by regulating the pressure upon the horizontal needles any variation of thread can be effected. For this purpose a square roller is used, with its four sides pierced with holes corresponding to the number of threads in the warp, in the same way as the wires and needles. A row of needles fits into a row of perforations, and each row of the latter is brought in succession against the needles by a motion received from the machinery. In the ordinary course the simple effect would be that all the wires would act, and all the warp threads be hooked upon the projections in the bar. In order to produce the variations in the arrangement of threads required for the production of the pattern, this roller is masked with what are known as pattern cards. These are perforated in accordance with the desired pattern, the holes, where there are any, corresponding with those of the rollers they cover. Where not perforated the card resists the action of the needle, pressing it back upon the spring, and so throwing the lifting bar out of the perpendicular, and preventing the lifting of the warp thread to which it is attached. The cards are looped together at the corners, and act as an endless chain, their perforations indicating the pattern.

Loomis, Elias, 1811-89; American physicist; b. Willington, Conn.; was tutor in Yale, 1833-36; Prof. of Natural Philosophy in Western Reserve College, 1837-44, in the Univ. of New York, 1844-60, and in Yale (with Astronomy added), from 1860 till death. He was the first person in the U. S. to obtain a view of Halley's comet at its return, 1835; devoted much of his time to astronomical and magnetic research; and, besides a large number of scientific treatises, published a series of text-books on mathematics, natural philosophy, astronomy, and meteorology that had a very large sale.

Loon. See **DIVER**.

Lope de Vega (lô'pâ dâ vâ'gâ). See **VEGA**, **LOPE DE**.

Lo'pez, Carlos Antonio, abt. 1795-1862; Paraguayan dictator; b. near Asuncion; was elected first consul, 1841, and practically became dictator, the successive congresses simply obeying his directions; was given unlimited powers, under a constitution written by himself, 1844, and then elected president for ten years; re-elected for three years, 1854, and for seven, with the right of naming his successor, 1857. His ill treatment of foreigners and insults to envoys and consuls brought about quarrels with the U. S., Great Britain, and France. In 1859 the U. S. sent a squadron to the Plata to enforce claims against him. He consented to submit the matter to arbitration, but subsequently evaded it.

Lopez, Francisco Solano, 1827-70; Paraguayan military officer and statesman; b. Asuncion; son of Carlos Antonio Lopez; at age of nineteen was made commander in chief of the

army; 1855, became Minister of War; on death of his father assumed the executive, and in the same year was elected president. In 1864 he summoned Brazil, which had intervened in the Civil War in Uruguay, to withdraw her troops from that country, and before an answer could be received sent a squadron, which took Coimbra and Corumba, and a land force which invaded Rio Grande do Sul, marching through Argentine territory. A protest from Buenos Aires caused Lopez to declare war against Brazil and Argentina, 1865, at which time he received the title of marshal. This led to a triple alliance between Brazil, the Argentine Republic, and Uruguay; the Paraguayan forces were defeated at all points, and Lopez, who had fled into N. Paraguay, was killed in a fight with Brazilian troops at the river Aquidaban.

Lopez, Narciso, abt. 1798-1851; Venezuelan filibuster; fought with the Spanish troops against the patriots of Venezuela, and when that country achieved its independence, 1823, went to Spain, where he served with distinction against the Carlists, and, 1840, became a general. The next year he went to Cuba, where, for a time, he held important military offices. Abt. 1848 he engaged in revolutionary plots, which were discovered, and, 1849, he fled to the U. S. The same year he organized a filibustering expedition, which was stopped by order of Pres. Taylor. A third attempt was made from New Orleans, 1851, in the steamer *Pampero*, with 600 men. The expedition resulted disastrously; a large number of the participants were captured, and as the U. S. Govt. had outlawed them, they were executed by the Cuban authorities; Lopez was shot at Havana.

Lophobranchii (lôf-ô-brân'ki-l), order of fishes distinguished especially by the projection of the snout and lower jaw into a tube, at the end of which is the mouth. The order contains the sea horses, pipe fishes, and their allies.

Lorain', city in Lorain Co., Ohio; on Lake Erie, at the mouth of Black River; 26 m. W. of Cleveland; is in a natural-gas region; has an excellent harbor; and is an important point for shipment of coal and receipt of iron ore and lumber by vessels. The principal industries are a large plant of the U. S. Steel Corporation, a plant of the American Shipbuilding Company, which builds the largest steel freight vessels on the Great Lakes, and plants for the manufacture of stoves, steam shovels, hand shovels, gas engines, and ice machinery. Pop. (1910) 28,883.

Lor'ca, city in province of Murcia, Spain; on the Sangonero—here called the Guadalentin—36 m. SW. of Murcia; is an old but well-built place, and has large manufactures of soap, dyestuffs, leather, paper, cloth, and gunpowder. In the vicinity are lead and sulphur mines. Pop. (1900) 69,836.

Lord Howe Island, isolated island under the supervision of New South Wales; 400 m. E. of the Australian coast; area, 3 sq. m.; pop. (1908) 101; is volcanic and very fertile.

Lord's Day, name for the first day of the week, derived from Rev. i, 10. The rendering "Lord's Day" is Wycliffe's, 1380. The day of our Lord's resurrection was observed in the apostolic times, and the title "Lord's Day" is applied in Ignatius, Irenæus, the Clementine Constitutions, and Tertullian, and at a later period universally.

Lord's Prayer, model Christian prayer which is given in two slightly varying versions in the gospels. Luke xi, 2-4, is a shorter form than that in Matthew vi, 9-13, where the prayer is given by Jesus as a part of his Sermon on the Mount. The best manuscripts omit the Doxology, which was apparently added abt. 100 A.D. Both versions probably follow an early Greek original version. They are certainly not independent translations of the Aramaic used by Jesus.

While it was given by Christ merely as a suggestion of the proper spirit of prayer, it has from the earliest times been used in all liturgies and forms of worship. Some of its phrases are borrowed from earlier Jewish sources, but its petitions sum up all other prayers, and it can be used as a pattern by devout persons of all creeds.

"The Lord's Prayer, for a succession of solemn thoughts, for fixing the attention upon a few great points, for suitability to every condition, for sufficiency, for conciseness without obscurity, for the weight and real importance of its petitions, is without an equal or a rival." —Paley, "Evidences of Christianity," p. 153.

Lord's Supper. See EUCHARIST.

Lorelei (lô-rê-lî), The, imposing cliff on the E. bank of the Rhine, $\frac{1}{2}$ m. above St. Goar. It is 447 ft. high, and penetrated by a railway tunnel. At its foot is a whirlpool and a famous salmon basin. The tradition is that a cave in the rock is the abode of the Lorelei, a wicked siren, whose beauty and sweet song distracted the boatmen on the river and caused them, through their negligence, to be wrecked in the whirlpool. The legend is the subject of a well-known poem by Heine.

Lo'renz, Adolf, 1854—; German surgeon; b. Silesia; was a poor boy, but entered the Univ. of Vienna, 1875; won an endowed scholarship; and received his degree in medicine, 1880. He became clinical assistant to Dr. Albert, but soon abandoned general for orthopedic surgery. In 1892 he first performed his "bloodless" operation for congenital hip dislocations, a system that he applied in many other operations. He visited the U. S., 1902 and 1903, holding clinics that attracted wide attention.

Lorenzo de' Medici (lô-rên'zô dâ mäd'ê-châs). See MEDICI.

Lorenzo Marques (lô-rên'sô măr'kês), capital of a district of same name in Portuguese E. Africa. The present town was founded (1867) on the site of an old village on Delagoa Bay, which affords the best harbor on the coast S. of Zanzibar. It is a regular port of call for steamers from Lisbon, Hamburg, and Dartmouth, is connected with Europe by the cable

laid along the E. African coast, and is the terminus of the Delagoa Bay and E. African Railway. Pop. (1901) 6,370.

Loreta (lô-râ'tâ), Pietro (Count), 1847-89; Italian surgeon; b. Ravenna; practiced until 1861, when he became anatomical prosector for Prof. Calori in Bologna; 1865, took charge of the surgical clinic in Bologna Univ.; 1868, became Prof. of Surgery there; was a surgeon of great skill and originality, and the method of dilatation of the pylorus for cancer was invented by him.

Loreto (lô-râ'tô), city of Italy; province of Ancona; 15 m. SW. of Ancona; contains a small church called the Holy House, which for centuries has been the resort of pilgrims, amounting to abt. 800,000 annually. This building, according to a legend, is the house in which the Virgin Mary was born and brought up. It is said that, after having been consecrated by the apostles, it was transferred by the ministry of angels from the power of the Turks—first to Dalmatia, 1291, and then to Loreto, 1294. Pop. (1901) 7,845.

Loreto, Sis'ters of (or "Friends of Mary at the Foot of the Cross"), Roman Catholic religious order for women, founded, 1812, in Kentucky, by Charles Nerinckx (1761-1824), a priest. They have many establishments in the U. S., and devote themselves to the education and care of destitute orphans.

Lo'ris-Mel'ikoff, Michael Tarielovitch (Count), 1826-88; Russian statesman; b. Lori, Transcaucasia; commanded a regiment of light cavalry in the Crimean War, and adjutant general to the Grand Duke Michael, who commanded the army of the Caucasus, 1877. Ardaban was taken in May and Kars in November, and after the war Loris-Melikoff was made a count; distinguished as Governor of Astrakhan by his measures against the plague; and as Governor of Kharkov by his measures against the Nihilists. After the crisis of February 17, 1880 (the blowing up of the dining room in the imperial palace of St. Petersburg), he was the chief of an extraordinary commission, with almost unlimited power, and afterwards Minister of the Interior.

Lorne, Marquis of. See ARGYLL, DUKE OF.

Lorrain (lôr-rân'), Claude, real name GELÉE, 1600-82; French landscape painter; b. Champagne on the Moselle; lived for a time in Rome and Naples; called to Nancy, then the capital of Lorraine, where he painted under the direction of the court painter of the Duke of Lorraine; returned to Rome abt. 1627, and there spent the rest of his life. The special charms of his work are clear, soft skies, with beautiful gradation of color and abundance of light over the whole landscape. He also left a number of etchings. His "Liber Veritas" consists of a number of very small drawings made as memoranda of his paintings.

Lorraine (lôr-rân') (German *Lothringen*), territory between the rivers Rhine, Saône, Meuse, and Scheldt. Originally, a portion of the empire of Charlemagne. After the extinction of the Carolingian house the Emperor

Otho I gave it to his brother Bruno, Archbishop of Cologne, who divided it into two parts—Upper Lorraine, between the Rhine, Saône, and Meuse, and Lower Lorraine, between the Rhine, Meuse, and Scheldt. The latter received the name of the Duchy of Brabant, became a part of Burgundy, fell to the house of Austria, and the greater part of it is now incorporated with Belgium. Upper Lorraine was ruled for centuries by a dynasty of its own, subject, however, either to French or to German authority, but by the peace of Westphalia, 1648, the three bishoprics of Toul, Metz, and Verdun were ceded to France. In 1733 the duchy was conquered by the French, and, 1737, Stanislaus, ex-King of Poland and father-in-law to Louis XV, was made duke. On his death, 1776, Upper Lorraine became a part of France. The inhabitants, however, remained German in language and customs in the E. and N. districts, and this part of the country, with the fortress of Metz, was ceded to Germany, May 10, 1871. It was governed, in connection with Alsace, as a province of the German Empire, till freed by the World War. Pop. (1910) 655,077. See ALSACE-LORRAINE.

Los Angeles (lōs āng'hē-lās), capital of Los Angeles Co., Cal.; on both banks of river of same name; 482 m. SE. of San Francisco and about 18 m. from the Pacific Ocean; is the center of a region characterized by an excellent climate and a soil that produces in profusion many of the fruits of semitropical as well as temperate climes. The region is also rich in gold, silver, coal, and other minerals, and has rich veins of petroleum. The city is the seat of the Univ. of S. California (Methodist Episcopal), Occidental College (Presbyterian), St. Vincent's College (Roman Catholic), a state normal school, and other educational institutions; has a Roman Catholic cathedral, large public library, several hospitals, and orphanages. It has several large parks, including Elysian, E. and W. Lake parks, and Griffith Park, of 3,000 acres. It is largely engaged in petroleum refining. The city was founded in 1781 by soldiers from the Mission of San Gabriel, under protection of the Spanish governor, while the country was a Mexican province. It passed into American possession in 1846, but was of no great importance until after 1880, at which date it had a population of abt. 11,000; in 1900 its population was over 100,000. Los Angeles is connected by electric lines with the seaports Redondo, San Pedro, and Port Los Angeles, and other coast towns. Pop. (1910) 319,198.

Loss'ing, Benson John, 1813-91; American historian; b. Beckman, N. Y.; edited in New York *The Family Magazine* and *The Young People's Mirror*, and in Philadelphia, 1872-75, *The American Historical Record*. He published many works, most of which were illustrated by himself, including "Pictorial Field-book of the Revolution" and "The Civil War in America."

Lossini (lōs-sē'nē), island in the Gulf of Quarnero, Adriatic Sea, belonging to the government of Trieste, Austria: 19 m. long and 3 m. broad. The principal town is Lossini

Piccolo, with an excellent harbor capable of receiving the largest men-of-war; has an active trade in wheat, wine, olive oil, fruits, etc.

Lot, son of Haran and nephew of Abraham. His history is related in Gen. xi-xix. With Abraham he took refuge in Egypt from a famine, and with him returned to Canaan. Abraham proposed a separation in consequence of the quarrels of their herdsmen, and Lot chose for himself the region of the Jordan, as far S. as Sodom. He was carried away captive, but was rescued by Abraham. He then fixed his abode in Sodom, but after its destruction fled to Zoar with his wife and two daughters. Then the narrative adds: "But his wife looked back from behind him, and she became a pillar of salt." Lot fled from Zoar to the neighboring mountains, and dwelt with his daughters in a cave. The latter, whose husbands had refused to leave Sodom, made their father drunk with wine, and became by him the mothers of Moab and Ammon, the progenitors of the Moabites and Ammonites.

Lot, tortuous river of France; rises in Mont Lozère, in the Cévennes; becomes navigable at Entraigues, and joins the Garonne at Aiguillon after a course of 270 m.

Lotbinière (lōt-bē-nī-ār'), **Michael Eustace Caspard** (Marquis de), 1723-99; Canadian military officer; was appointed engineer to the French colony, 1753; soon after the defeat of Baron Dieskau, 1755, he constructed Fort Carillon (Ticonderoga), with the object of preventing the British from entering Canada, and contributed more than any other person to the defeat of the British at that place.

Lothaire (lō-tār'), I, abt. 796-855; Emperor of the West; son of Louis le Débonnaire; was crowned King of Italy, 822; after birth of Charles the Bald he incited his brothers Pepin and Louis to revolt, and twice dethroned his father, 830 and 833; became emperor on the death of his father, 840, but was involved in disputes with his brothers Louis and Charles, and was defeated by them in the battle of Fontenay, June 25, 841. By the Treaty of Verdun, 843, he received Italy, Burgundy, and a district in the E. of France, afterwards (from his son Lothaire, its first king) called Lotharingia or Lorraine.

Lothaire II, or III (THE SAXON), 1075-1137; German emperor; married Richenza, daughter of the Duke of Saxony; soon became actual ruler of the duchy, and was made duke by Henry V, against whom he revolted several times. Lothaire was elected to succeed him, 1125, and crowned King of Germany at Aix-la-Chapelle, September 13th. The dukes of Swabia and Franconia refused to acknowledge him, but Lothaire made alliance with Pope Innocent II, defeated the Duke of Swabia, 1132, and was crowned Emperor of the Romans by Pope Innocent, 1133. He drove the antipope Anacletus out of Italy, and died on his way home.

Lotharingia (lō-thā-rin'jī-ā). See ALSACE-LORRAINE.

Lo'thian, old Scottish name now applied to Haddington, Edinburgh, and Linlithgow as E., Middle, and W. Lothian respectively. Though now confined to the S. shore of the Forth, it formerly extended S. to the Tweed and W. to the Cheviots and Lowthers.

Loti (lô-tê'), Pierre, pseudonym of JULIEN VIAUD, 1850- ; novelist; b. Rochefort, France. He was educated in the naval academy and entered the French navy, in which he is an officer. His novels and sketches—"Le Mariage de Loti," "Le Roman d'un Spahi," "Mon frère Yves," "Pêcheur d'Islande," "Japoneries d'automne," "Madame Chrysanthème," "Le Roman d'un Enfant," "Le Livre de la pitié et de la mort," and others—produced in rather rapid succession since 1877, are very simple in construction, often without plot, dealing with few characters, and choosing them from simple sailors and fishermen, or from the representatives of the exotic civilizations of the lands whose life and nature they describe—Japan, Tahiti, Senegal, Morocco. He was elected to the Academy in 1891.

Lot'tery, a sort of gaming contract, by which, for a valuable consideration, one may by the lot obtain a prize of a value superior to the value which he risks. The first lottery in France was established 1539. A law, promulgated 1798, prohibited all private or foreign lotteries, and from that date the *loteries nationales* displaced all others. They were instituted in all the large cities. This government monopoly lasted till 1836, when the law of May 21st abolished all lotteries. In Germany the first "class" lottery was opened at Nuremberg, 1699. The earliest English lottery of which there is any record was instituted 1569. The first Parliamentary lottery was established 1709. In the English state lotteries the usual plan was to distribute in prizes of different magnitudes an amount equal to £10 for each ticket; the profit consisted in the advance on this value paid by contractors, who sold directly to the people. The prizes were generally funded in annuities. In 1823 lotteries were suppressed in England, and the sale of foreign lottery tickets prohibited. In the U. S. the lottery was long extensively employed for many important and beneficial public purposes. Colleges have been founded, churches built or repaired, roads made, bridges built, ferries improved, and hospitals erected by the aid of lotteries. In 1833 a society was formed in Pennsylvania which advocated their suppression, and now in all of the states the constitution forbids the legislature to authorize them, and the parties concerned in them, as well as those who advertise foreign lotteries, are subject to heavy penalties.

In 1808 the Louisiana Legislature granted a lottery charter, and the company carrying on the business became a great social and political power, silencing the press outside as well as inside the state, contributing to campaign funds, charities, etc., and breaking the laws of other states in selling tickets. An attempt to renew the charter, 1890, coupled with an offer of \$1,250,000 as the people's share of the profits—practically a bribe to the legal voters—

stirred up an opposition campaign, in which the churches of Louisiana took a conspicuous part. The campaign resulted in a split in the Democratic Party of the state and the election of a legislature which promptly passed an act declaring it a felony to conduct a lottery in Louisiana after December 31, 1893. With this act the last refuge of the lottery business was lost, and it became an outlaw in every state in the Union.

Lo'tus, or Lo'tos, name applied in literature to many widely different plants: (1) To the *Zizyphus lotus*, a kind of jujube tree of Barbary (family *Rhamnaceæ*), whose fruit is extensively gathered as food. It is probably the tree whose fruit beguiled the Lotophagi or Lotus-eaters. (2) The ebenaceous date plum or pishamin (*Diospyros lotus*) of Europe and Asia, much resembling our persimmon, and producing a valuable fruit. (3, 4) The fragrant blue and white Nilotic water lilies (*Casalia cœrulea* and *C. lotus*), which were greatly



LOTUS CORNICULATUS.

honored by the Egyptians, and were everywhere worshiped. The stalks and roots furnished food. (5) The *Nelumbo speciosa*, or sacred Egyptian bean, another beautiful pink water lily, mystically honored in China and India, as well as in ancient Egypt. Its large seeds and roots were, and are still, eaten. This is the lotus flower (*padme*, lily pad) of India. (6) There is a large genus of cloverlike leguminous plants called *Lotus* by Linnaeus, and still bearing that name. It includes the bird's-foot trefoils and other Old World plants, which in Europe are cultivated as forage herbs. (7) In the U. S. botanical writers apply the name lotus to the *Nelumbo lutea*. It closely resembles No. 5 of this article. It is known as the water chinquapin.

Lotus-eat'ers, or Lotoph'agi, people first mentioned by Homer as feeding on the sweet fruit of the lotus, the quality of which was such that all who ate of it forgot their native land and lost desire to return. The ancient geographers placed the lotus-eaters on what is now the coast of Tripoli, near the Lesser Syrtis, as well as on the island of Meninx.

Lotze (lôt'sèh), **Hermann Rudolf**, 1817-81; German philosopher; b. Bautzen, Saxony; became Prof. of Mental Philosophy at Leipzig, 1843; held the same chair at Göttingen, 1844-81; very early pronounced against the Hegelian philosophy on the one side and materialism on the other, and joining the small circle of theistic philosophers, Fischer, I. H. Fichte, Ulrici, etc., developed his own conception of theism. His principal works are "Microcosmus," "System of Philosophy," "Logic," "Metaphysics," "History of Aesthetics in Germany," "Medical Psychology," "Outlines." (from lectures). Lotze combines in a coherent and organic system of philosophy the leading philosophical and scientific conceptions of his century. In the U. S. his influence is stronger in academic philosophy, perhaps, than that of any other author; and in several ways: (1) He gave impulse to the recent development of physiological psychology both by his doctrine of the relation of body and mind and by his positive contributions of psycho-physical theory (i.e., the theory of "local signs"); (2) his philosophy has tended to replace the theological natural realism inherited from Scotland; (3) his more adequate treatment of positive science, as affording basis for philosophical construction, has brought metaphysics into closer touch with the empirical disciplines.

Loubet (lô-bâ'), **Émile**, 1838- ; French statesman; b. Marsanne; studied law; began practice at Montelimar; elected mayor; sent to the Chamber of Deputies, 1876; to the Senate, 1885; Minister of Public Works, 1887-88; formed cabinet and assumed Ministry of the Interior, February, 1892; Carmaux mining troubles and exposure of Panama Canal scandals led to downfall of cabinet, but without involving his honor, November following; elected president of the Senate, 1896, 1898; succeeded Félix Faure as President of the French Republic, 1899; was succeeded by Armand Fallières, 1906.

Louis (lô-è') **I**, King of Bavaria. See **LUDWIG I**.

Louis II, King of Bavaria. See **LUDWIG II**.

Louis I (surnamed **LE DÉBONNAIRE**, "The Compliant" and **LE PIEUX** "The Pious"), 778-840; Emperor of the Holy Roman Empire and King of the Franks; b. Casseneuil, Aquitania; son of Charlemagne, whom he succeeded, 814; gave his sons a share in his dominions, 817, Lothair receiving Austrasia and the title of emperor; Pepin, Aquitania; Louis, Bavaria, Bohemia, and the Avarian districts on the E. frontier. His nephew Louis, who had inherited Italy after his father, revolted against him, had his eyes put out, and died a prisoner. In 829 he attempted a new division of his territories, to make a kingdom for his son by a second wife, Charles the Bald, but his other sons revolted and had him deposed, 830. The people soon restored him; another revolt resulted in his degradation, 833; was again restored, 835.

Louis, name of a number of the kings of France, the most important of whom follow:

LOUIS I. See **LOUIS I (LE DÉBONNAIRE)**.

LOUIS IX (SAINT), 1215-70; son of Louis VIII; ascended the throne, 1236, the government during his minority having been in the hands of his mother; defeated the rebellious Count of Marche, who was supported by Henry III of England, 1242. He married Margaret of Provence, 1234. In August, 1248, he left France on a crusade with an army of 80,000 men, and in 1249 invaded Egypt and took Damietta, but, 1250, was defeated and taken prisoner by the Egyptians, and liberated only after paying a heavy ransom. After spending several years in Syria, he returned to France, with about 500 followers, 1254. The following fifteen years of his reign were marked with many wise and vigorous reforms, and by the foundation of the Sorbonne, of the library of Paris. The Univ. of Paris under his inspiration and direction acquired international fame. The general wisdom and energy of his rule entitle him to recognition as one of the greatest and noblest of French kings. In June, 1270, the king embarked with an army of 60,000 men for a new crusade. He landed in Tunis, but the plague broke out in the army, and he died before reaching the city of Tunis. He was canonized by Pope Boniface VIII, 1297. His son Philippe le Hardi succeeded him.

LOUIS XI, 1423-83; b. Bourges; eldest son of Charles VII; made unsuccessful attempts against his father's throne and was obliged to take refuge in Burgundy; succeeded to the crown, 1461; married Charlotte, a daughter of the Duke of Savoy; consolidated the territory of France and the authority of the French crown in this territory; founded numerous institutions of great public benefit; by massacre and other means curbed the feudal houses of France, but arrayed them against him. By intrigue he came into possession of Provence, Maine, Anjou, etc., and incited the people of Liège to revolt against Charles the Bold. When Charles fell in the battle of Nancy, 1477, Louis at once incorporated Champagne, Artois, Picardy, and parts of Flanders with France, and managed to keep them in spite of the protests of Charles's heirs. In his internal policy he favored the lower and middle classes, especially the cities; encouraged learning, art manufactures, and trades; improved public roads and canals; established the first post system; made the administration of justice regular and cheap, etc.; nevertheless, he was feared and hated by all, and spent the last years of his life in the fortress of Plessis-les-Tours, where he died.

LOUIS XII, 1462-1515; b. Blois; son of Duke Charles of Orleans; succeeded Charles VIII, 1498; laid claim to Milan and conquered it, 1500; soon after, with Ferdinand of Aragon, conquered Naples, but the allied monarchs quarreled and warred against each other, and, 1503, the French were expelled from S. Italy. In 1508 Pope Julius II formed the League of Cambray between Ferdinand of Aragon, Louis XII, and the Emperor of Germany against the republic of Venice; but Venice having satisfied the pope by ceding several towns to him, and the pope having become much alarmed at the progress of the French

in Italy, the league was suddenly dissolved, and a new one, the so-called Holy League, was formed, 1511, between the pope, the emperor, Venice, Ferdinand of Aragon, and Henry VIII of England against France. Defeated at Novara, the French were driven out of Italy, 1513. At the same time Henry VIII landed in France with an army of 45,000 men, and having joined the imperial army pushing forward from the Netherlands, defeated the French at Guinegate. Thus hard pressed on all sides, Louis began to negotiate, and succeeded in escaping from the difficult situation without any great loss. One of his last acts was a marriage with Mary Tudor, sister of Henry VIII of England. Having no sons, he was succeeded by Francis I.

LOUIS XIII, 1601-43; b. Fontainebleau; son of Henry IV and Mary of Médici; succeeded to the throne 1610, his mother being regent; was declared of age, 1614; married Anne of Austria, daughter of Philip III of Spain, 1615; lived mostly in seclusion, occupied in hunting and quiet social enjoyments, and the affairs of state after 1621 were conducted by Richelieu, afterwards cardinal and duke. The king took an active part in suppressing Protestantism and was at the siege of Rochelle, 1628. The power and importance of France were greatly increased during his reign.

LOUIS XIV (surnamed THE GREAT), 1638-1715; b. St. Germain-en-Laye; son of Louis XIII; married Maria Theresa, daughter of Philip IV of Spain, 1659. During his minority his mother and Cardinal Mazarin governed the country, and brought to a final close the contest between the royal power and the wealthy and ambitious aristocracy, represented at this period by the League of the Fronde. To this minister belongs the chief credit for the great gains secured by France in the Peace of Westphalia at the close of the Thirty Years' War, 1648. Mazarin died March 9, 1661, and the king suddenly assumed the reins of government, as his own prime minister. Colbert, who was made financier, brought order in the whole internal administration, and under his leadership great enterprises were undertaken with success. The harbors and shippards of Brest, Rochefort, Lorient, Havre, Dunkirk, Cete, and Toulon were constructed and fortified; the Canal of Languedoc, uniting the Atlantic with the Mediterranean, was built, and other canals and public roads were improved; commercial treaties were concluded with Holland and Italy; manufactures of different kinds were established; and while the condition of the people improved, the revenues increased and the king grew rich. No less successful was Louis XIV in the organization and development of the intellectual life of the French people. The Academy of Inscriptions and Belles-Lettres was founded 1663; the Academy of Sciences, 1666; the Academy of Painting and Sculpture, 1667; the Royal Library was greatly increased; an observatory was built at Paris; and all these institutions were not only amply supported, but the interest the king showed for them gave their social position dignity and influence. Louvois, Vauban, and the Duke of Beaufort created a powerful army and navy, which, under the leadership of Turenne, Condé, Lux-

embourg, Vendôme, Duquesne, Tourville, and others, made any movements of the king with respect to his foreign policy most effective.

In 1665 Philip IV of Spain died, and Louis now claimed the Spanish possessions in the Netherlands, and overran the country with a large army. A triple alliance formed between England, Holland, and Sweden cut short his career of conquest, but by the treaty of Aix-la-Chapelle (1668) Louis obtained the so-called French Flanders, besides a number of places along the frontier. He soon purchased with money the friendship of Charles II of England, who became his ally when Louis, 1670, began a war against Holland. Holland, Brandenburg, the Emperor of Germany, and Spain then combined against France, but by the Peace of Nimeguen, 1678, Louis obtained Franche-Comte and Alsace. Continuing his aggressions, he seized Strassburg, Luxembourg, and so on, which led to the League of Augsburg, 1686, between Holland, Austria, Spain, Bavaria, and Savoy, but, although the king opened the war with energy, devastated the palatinate, and gained brilliant victories, he was forced by the Peace of Ryswick, 1697, to give up all the conquests he had made and to make considerable commercial concessions to Holland.

Colbert died 1683, Louvois, Minister of War, 1691, and the government passed into the hands of Madame Maintenon, whom the king married secretly, 1685. The Revocation of the Edict of Nantes (October 22, 1685) threw the internal affairs of the country into a most disastrous confusion. The building of Versailles and the expensive armaments for the reestablishment of James II in England completely exhausted the finances; and while the means of realization became more and more limited, the plans of the king became more and more arrogant. His pride and egotism assumed the most odious forms. He maintained a bloody war along the whole frontier merely for the whims of his vanity. He banished, persecuted, and ruined his own subjects merely because they did not hold the same creed. Anticipating the death of Charles II of Spain, Louis devoted the last years of the century to preparations for war. The question of the succession was so complicated that it involved England as well as Germany and Spain. The War of the Spanish Succession, 1700-13, is memorable not only for the great victories of Marlborough at Blenheim and Malplaquet, but also for the general impoverishment of France and the loss of much of her territory.

LOUIS XV, 1710-74; b. Versailles; great-grandson of Louis XIV; third son of Louis, Duke of Burgundy. During his minority the country was governed by the Duke of Orleans, during whose regency the country was plunged into the deepest financial embarrassment by the failure of the great Mississippi scheme. After the death of the duke, 1723, Cardinal Fleury, who had been the teacher of the young king, became Prime Minister, and his parsimony restored some order to the finances, which had been brought to the very verge of bankruptcy by the prodigality of Louis XIV and the wild schemes of the regent. The young king married, 1725, Maria Leszczynski,

a daughter of Stanislaus, ex-King of Poland. The war with Saxony, Russia, and Austria, which France began, 1733, for the purpose of reinstating Stanislaus on the Polish throne, was conducted with success, and brought the country the beautiful province of Lorraine by the Peace of Vienna, 1738. During the Austrian War of Succession Cardinal Fleury died, 1743, and Madame de Pompadour rose to power as the king's mistress. Her authority, well nigh absolute, lasted for twenty years. The profligacy of the court became the scandal of Europe.

Meanwhile foreign affairs were becoming more and more complicated through the claims and the energy of Frederick the Great. In the first and second Silesian wars France was in alliance with Prussia; but in the third, or Seven Years' War, the influence of Maria Theresa and Kaunitz on Madame de Pompadour led the French Govt. to an Austrian alliance against Prussia and England. The result was disastrous, for France had to cope with the statesmanship of William Pitt as well as with that of Frederick the Great. The consequence was that France suffered the immeasurable calamity of losing India and Canada. The popular opposition to the abuses of the royal authority began to show itself through the Parliament of Paris, whose privilege it was to countersign the royal tax edicts, but which refused to do so. The resistance, however, was curbed with violence. The Parliament was broken up, its members punished, and replaced by more willing tools. Society was disorganized. The clergy was divided into two antagonistic interests; for the higher prelates had the rank of nobles and were able to impose heavy burdens on the people, while they were exempt from the necessity of bearing burdens themselves. The lower clergy were generally devoted to their duties. The burgher or citizen class had grown in prosperity since the death of Louis XIV, but the peasantry was in a most wretched condition. About a quarter of the soil was in their hands; but the burdens of taxation were so excessive and the lack of capital so universal that every year thousands of them were reduced to the point of famine. Matters grew worse until the king's death. His reign, which extended over forty-nine years, was one uninterrupted calamity to the nation.

LOUIS XVI, 1754-93; b. Versailles; son of Louis, Dauphin of France; grandson of Louis XV; married Marie Antoinette, daughter of Maria Theresa, Empress of Austria, 1770; ascended the throne, 1774; appointed Turgot Minister of the Finances. Louis was a good-natured, well-meaning, honest man, of pure morals, and capable of making a sacrifice for the public weal, but his will was weak and his intellect narrow. He was unable to comprehend the situation, and he was entirely destitute of political instincts. Thus he hastened the approach of the Revolution. The finances, burdened by a new debt of 1,500,000,000 fr., contracted by the participation of France in the war of independence in N. America, formed the point of issue. The annual budget showed a deficit of 140,000,000 fr. There were two

remedies—restriction of the expenses, which the queen and the court opposed, and taxing the privileged classes, which the Parliament opposed. The king hoped to find a third expedient by appealing to the people; and thus it came to pass that he himself appealed to the Revolution. When he summoned the States-General, which had not met in one hundred and seventy-five years, he afforded the opportunity for outbreak. When the representatives of the third estate were refused a seat with the other estates, they determined to take matters into their own hands. The Assembly became a prey to faction. The hopelessness of the situation led to all manner of excesses. The king was finally tried, condemned, and executed.

LOUIS XVII, 1785-95; titular King of France; b. Versailles; second son of Louis XVI and Marie Antoinette; shared at first the imprisonment of his parents in the tower of the Temple, but was, after the decapitation of his father, separated from his mother, and died of ill treatment and neglect in his cell. A number of impostors pretended to be Louis XVII, and excited some attention, but their claims were easily disproved.

LOUIS XVIII, 1755-1824; b. Versailles; brother of Louis XVI; received at birth the title of Count of Provence; married, 1771, Marie Joséphine de Savoy; escaped from Paris, 1791, and lived in Coblenz, Verona, Milan, and England; assumed the title of King of France, 1795. In April, 1814, Napoleon having fallen, he returned to Paris, took the throne, and accepted a constitutional charter presented by his ministers; was influenced wholly by the nobles and the priests; treated with severity the Protestants, imperialists, and republicans; fled to Ghent on the return of Napoleon from Elba; returned under the protection of the Duke of Wellington, 1815. His reign was a time of confusion and dullness, and in the actual process of restoration and reorganization, which went on silently and instinctively, he took no part.

Louisa, 1776-1810; Queen of Prussia; was a princess of the ducal house of Mecklenburg-Strelitz; married, 1793, the Crown Prince of Prussia, who ascended the throne, 1797, as Frederick William III. After the fatal defeat at Jena, 1806, the queen accompanied the king to Königsberg, and bore with dignity the humiliations attending the country's overthrow. In the negotiations of the Treaty of Tilsit, 1807, she endeavored by a personal interview with Napoleon to mitigate the peace conditions, but without effect. Her youngest son was Emperor William I.

Louisburg, fortress built by the French soon after the Peace of Utrecht (1713) on the E. coast of Cape Breton, receiving its name in honor of Louis XIV. In 1745 it was besieged and taken by Massachusetts, Connecticut, and New Hampshire militia, France and Great Britain being then at war. The town (of some 3,000 inhabitants) was invested, 1758, by Gen. Amherst with a British force and large army, and was quite destroyed, while

the walls of the fortress were so badly breached that the garrison and French fleet surrendered.

Louis d'Or (lô-i dô'r'), French gold coin, first struck, 1641, under Louis XIII, not coined since 1795, but the name is often given to the 20-fr. piece or gold Napoleon, and to certain German 5-thaler pieces. The value of the louis fluctuated considerably, but may be roughly stated to be about \$5 in U. S. money.

Louis the German, abt. 805-76; founder of the German Empire; son of Louis I (surnamed Le Débonnaire); received, by the first division of the empire of Charlemagne, 817, Bavaria and the Slavic countries on the E. frontier, but by the Treaty of Verdun, 843, obtained the whole territory E. of the Rhine, and became the founder of the German Empire. Invited by the discontented vassals of Charles the Bald, he broke into France, 858, and conquered the country, but a union of the E. and W. Franks proved impossible, and Louis was compelled to give up his conquests. Against the Bulgarians in the SE. and the Normans in the NW. he fought with valor, though not always with success. After his death his sons divided the empire between them.

Louis the Great, 1326-82; King of Hungary; son of Charles Robert of Anjou; most successful of the elective monarchs of that country; ascended the throne, 1342; extended the boundaries of Hungary to the SE.; and united Poland to it on the death of Casimir the Great, 1370.

Louisiade (lô-ê-zê-âd') Archipel'ago, group of islands off New Guinea, of which they form an extension; have belonged to Great Britain since 1885; group extends about 300 m., and consists of three large islands and numerous islets; islands are St. Rignan (nearest New Guinea), Southeast, and Rossel; area of group, 850 sq. m.; inhabitants are Papuans.

Louisiana (named in honor of Louis XIV), popular names, Pelican State, Creole State; state flower, magnolia; state in the S. central division of the American Union; bounded N. by Arkansas and Mississippi, E. by Mississippi, S. by the Gulf of Mexico, W. by Texas; area, 48,506 sq. m.; pop. (1910) 1,656,388, including 713,874 negroes; principal cities and towns, New Orleans, Shreveport, Baton Rouge, New Iberia, Lake Charles, Alexandria, Monroe, Crowley, Donaldsonville, Plaquemine, Lafayette, Thibodaux, Houma, Opelousas, Franklin, Natchitoches, and Morgan City. The surface is divided into good upland, pine hills, bluff lands, prairie, arable alluvial land, pine flats, and coast marsh; highest measured point, near Arcadia, Bienville Parish, 387 ft. The Mississippi traverses the state from N. to S. for nearly 600 m., and has as its chief affluent the Red River, which is navigable for large steamboats throughout a great part of its course. In seasons of high water its floods are diverted into the Atchafalaya River. Other navigable rivers are the Ouachita or Washita, Beauf, Tensas, Pearl, Sabine, and Calcasieu. The bayous are generally navigable, and with the indentations of the coast line constitute an important

system of commercial waterways, unsurpassed in the U. S.

The climate is mild and genial and little exposed to extremes in temperature. The average rainfall for the state is 51 in., and the annual range of temperature in the Gulf district is 62° and in the interior 83°. The alluvial lands are of inexhaustible fertility; the uplands are fertile; the pine flats, with irrigation and fertilizers, yield fair profits; the coast marsh lands, susceptible of culture only at great cost, afford pasture for large herds of cattle. Principal crops, sugar, cotton, rice, Indian corn. Orange culture is carried on to some extent; the apple, pear, quince, etc., are cultivated, and great quantities of small fruits are raised for the N. markets. Tobacco is grown, but in limited quantities. The principal farm crops, 1911, were: Corn, 33,300,000



SEAL OF LOUISIANA.

bushels; rice, 11,693,000 bushels, valued at \$9,237,000. The cotton crop (1910) was 256,375,000 bales, value \$17,250,000; cotton seed, 109,000 tons, \$2,880,000; cane sugar crop (1911) 300,000 tons. In 1911 there were 288,000 milch cows, 516,000 other cattle, 176,000 sheep, and 1,642,000 swine in the state.

Minerals include marble, sulphur, salt, lignite, fire clay, petroleum, copper, sandstone, ocher, marl, gypsum, kaolin, lead, sulphate of soda, sulphate of iron, and carbonate of lime; value of total products, 1910, \$10,119,993. Sugar refining and the manufacture of lumber and timber products, naval stores, etc., are the leading manufacturing industries. Louisiana, next to Arkansas, is the most heavily wooded state in the Union, and has many valuable kinds of timber trees, the long and the short leaved pine and the swamp cypress standing preëminent; number of "factory-system" manufacturing establishments (1909), 2,516; capital invested, \$221,816,000; value products, \$223,949,000.

In the value of domestic and foreign imports New Orleans stands fourth among U. S. ports; in value of exports, third, exceeded only by Galveston and New York; value of imports in fiscal year 1910-11, \$66,722,295; exports, \$172,835,293; tonnage of sail and steam vessels entering the port, same period, 2,019,067; clearing, 2,249,883.

Institutions of college grade for white students: Tulane Univ., Louisiana State Univ., and Agricultural and Mechanical College at Baton Rouge, State Normal School, Centenary College (Methodist Episcopal), and Jefferson College (Roman Catholic). There are four universities in New Orleans for colored students: the Southern (state), Straight (Congregational), Leland (Baptist), and the New Orleans (Methodist Episcopal North).

The first Europeans to set foot in Louisiana were Alvarez de Pineda and his companions, 1519. Ten years later Pamphilo de Narvaez touched at the mouth of the Mississippi. In 1541 Hernando de Soto crossed the Mississippi, to perish in the wilderness. In 1682 Robert Cavalier de la Salle descended the Mississippi to its mouth and took possession of the land for his king, Louis XIV. Pierre le Moyne d'Iberville, at the head of a colony, established a colony at Biloxi, February, 1699, and founded New Orleans, 1718. In 1712 a royal charter granted Louisiana to a rich merchant, Antoine Crozat, as a trading establishment, but he surrendered his charter, 1718, and another was granted to the Company of the West, a monopoly under the control of John Law, who obtained various privileges of trade and colonization, which, however, finally inured to the benefit of the colony. In 1722 Bienville was authorized to remove the capital from Biloxi to New Orleans. In 1731 Louisiana was declared a royal province. In 1763 France, by the Treaty of Paris, surrendered to Great Britain all her territory E. of the Mississippi, except New Orleans and the adjacent district. On the same day, by a secret treaty, France ceded to Spain all the rest of her territory in America. A revolt against Spanish authority led to the seizure of New Orleans, and after the declaration of war by Spain against Great Britain, Baton Rouge, Natchez, Mobile, and Pensacola were seized, and the surrender of all W. Florida to Spain was secured.

On October 1, 1800, Napoleon made a secret treaty with Spain by which Louisiana was restored to France, with its former boundaries, and, April 30, 1803, he sold the province to the U. S. for \$15,000,000. The territory was formally transferred on December 17th following; the part now known as Louisiana was organized by Congress as the Territory of Orleans, March 26, 1804, and was admitted to the Union as a state, April 30, 1812. The state seceded from the Union, January 28, 1861, and was not readmitted till 1868. The possession of New Orleans was one of the earliest objects of the Federal Govt. at the beginning of the Civil War. During the reconstruction period New Orleans was the scene of long-continued excitement, of conflicts between the White League and the metropolitan police, and of Federal military intervention. In 1877 President Hayes withdrew the support of the U. S. troops from the state government headed by Stephen B. Packard, whereupon the state government headed by Francis T. Nicholls assumed the administration of state affairs.

In 1884 a centennial exposition to celebrate the first shipment abroad of cotton was held in New Orleans. In 1893 a lottery, which had

existed since 1868 and had acquired great political power in the state, was suppressed by the legislature.

Louisiana Purchase. The, was the purchase by the U. S. from France of the province of Louisiana; it was negotiated by Robert Livingston and James Monroe, who were sent to France as envoys of the United States during Jefferson's administration. The treaty, which was signed April 30, 1803, gave to the U. S., for the sum of \$15,000,000, territory estimated at 1,171,931 sq. m., being the entire possessions of France W. of the Mississippi River. The territory thus purchased comprised the region between the Mississippi River and the Rocky Mountains, extending N. from Texas to the Canadian line. Spain had acquired this territory from France by the Treaty of Paris, 1763, and had given it back under provisions of the Treaty of 1801. Napoleon I contemplated colonizing this territory, but foreseeing that he was likely to become involved in a war with Great Britain, and being in need of funds, he concluded to sell the territory, realizing also that the French forces could not hold the Mississippi River against the British fleets. The constitutionality of Jefferson's act was questioned and was condemned by many Federalists, but it was approved by the people in general, who realized that by it the nation's territory had been more than doubled. It caused Spain considerable anxiety about her Florida possessions, and provoked some hostility on her part toward the U. S.

Louisiana Purchase Exposition. See EXPOSITIONS.

Lou'is le Débonnaire (déb-ô-nâr'). See LOUIS I.

Louis Philippe (fê-lép'), 1773-1850; King of France; b. Paris; eldest son of Duke Louis Philippe Joseph of Orleans, known as Philip Egalité; entered the National Guard and the Jacobin Club, and renounced his titles for the name of Citizen Egalité; distinguished himself as Gen. de Chartres in the battle of Jemappes, 1792; commanded the center at the unsuccessful battle of Neerwinden; was suspected of intriguing for the throne, and fled into Austrian territory, 1793. After living in Switzerland, where he taught mathematics in a school under the name of Chambaud-Latour, and traveling in Scandinavia, he sailed for the U. S., 1796, and there resided until 1800, in company with his brothers, the Duke of Montpensier and the Count of Beauplais.

After fruitless attempts to reach Spain, where their mother lived in exile, the brothers settled at Twickenham, near London. In 1809 Louis Philippe repaired to the court of Ferdinand I of Sicily and married the Princess Maria Amélie. After the fall of Napoleon he returned to Paris, was reinstated in the possessions of his family, and was known as the Duke of Orleans. On the outbreak of the Revolution of July, 1830, the Chamber of Deputies, after deposing the king, chose him lieutenant general of the realm. In August he was elected king. The foundation of the Kingdom of Belgium, which protected the N. fron-

tier, and the conquest of Algeria are among the most notable events of his reign. Resistance on his part to an extension of the elective franchise led to a revolution, February, 1848, and he was banished. Died at Clermont, near London, leaving four sons, styled the Duke of Nemours, the Duke of Montpensier, the Prince of Joinville, and the Duke of Aumale.

Louisville, chief city of Kentucky and capital of Jefferson Co.; situated at the falls of the Ohio River, 130 m. below Cincinnati; is connected by bridges with the cities of Jeffersonville and New Albany, Ind., and is entered by five railroads from Kentucky and five from the Indiana side of the Ohio. A canal around the falls removes all serious obstruction to the navigation of the river. The city stands on a plateau, 70 ft. above low water; is attractively laid out, has many parks and pleasure grounds, and is one of the most healthful cities in the U. S. Among the public buildings are the courthouse, American National Bank, Louisville Medical College, Museum of the Polytechnic Society of Kentucky, Louisville Trust Company Building, and Louisville Male High School. Here are 8 medical colleges, 4 theological seminaries, a law school, a normal school, a manual training school, 2 schools of pharmacy, a school of dentistry, an art school, the state school for the blind, etc. The city has a large trade in pork, wheat, and corn; is one of the largest tobacco markets in the world, and has numerous manufactures, those of whisky, water and gas pipes, plows, wagons, flour, leather, hydraulic cement, jeans, and furniture being prominent; number of "factory-system" manufacturing establishments (1909), 903; capital invested, \$79,437,000; value products, \$101,284,000. Louisville was founded, 1779; incorporated as a city, 1828. Pop. (1910) 223,928.

Lourdes (lôrd), town in department of Hautes-Pyrénées, France; 12 m. SW. of Tarbes; on the Gave de Pau; is chiefly noted for the grotto of Massavielle, in which Roman Catholics believe the Virgin Mary revealed herself frequently, 1858, to a peasant girl. A large church has been built above the grotto, and the place is visited by pilgrims from all parts of the world. The town has considerable trade in rosaries and in the water of its miraculous fountain. Pop. (1901) 7,690.

Louse. See LICE.

Louvain (lô-vân'), city of Belgium; in province of Brabant; on the Dyle; 19 m. E. of Brussels. In the fourteenth century it had 200,000 inhabitants, and was one of the largest manufacturing cities in the world, employing 15,000 workmen in cloth manufacturing alone. In the sixteenth century its university was one of the first scientific institutions in Europe, celebrated especially for its department of Roman Catholic theology, but during the French Revolution the university was suppressed, and, although it was reconstituted, 1817, it has not regained its past glory. In the World War it was destroyed by the Germans, Aug. 26, 1914, not even its magnificent cath-

edral, one of the wonders of the world, being spared. Pop. (1910) 42,483.

Louvois (lô-vwâ'), François Michel Letellier (Marquis de); 1641-01; French statesman; b. Paris. From 1668, when he assumed the sole direction of the War Department, until the Peace of Nimeguen, 1678, he was incessantly employed in planning and conducting campaigns. The devastation of the Palatinate, 1674, is generally supposed to have been instigated by him. On the other hand, he projected the Hôtel des Invalides, the Place Vendôme, and the Palace of Versailles, and promoted charities and military reforms. After the death of Colbert, 1683, he became almost omnipotent. He was urgent with the king to revoke the Edict of Nantes, and directed the *dragonnades* against the Huguenots. In 1688, when the war broke out between France and the League of Continental Powers, headed by the Prince of Orange, he displayed remarkable resources; but his arrogance began to incense the king, especially after the siege and capture of Mons, 1691, when Louis reproached him with the numerous terrible measures into which he had goaded him.

Louvre (lôvr), The, ancient palace of the kings of France, now used chiefly as a museum of art, in Paris, close to the N. bank of the Seine. Throughout the Middle Ages the Louvre was a strong castle, which owed its chief character to the kings Philip Augustus and Charles V. Francis I destroyed the old keep, and his successors began and carried on a structure on all sides of a square court, and four times the size of the old castle, besides some galleries carried S. and W. along the river. The Palace of the Tuileries stands a third of a mile farther W., and the kings from Henry IV on were always aiming at the extension of the one building to connect with the other, but this was only completed under Napoleon III. During the Communist revolt of 1871 the buildings of the new galleries were very seriously damaged by fire.

The Museum of the Louvre is the most extensive and varied of Europe. It includes almost everything that has ever been considered material for a public collection of works of art; paintings both ancient and modern, and in immense number and great variety of schools and epochs; a splendid collection of drawings by the greatest masters; sculpture, Egyptian, Assyrian, Greek, Roman and Greco-Roman, mediæval, Renaissance, post-Renaissance, and modern; Greek and Etruscan vases in great numbers; vases and cups of rich material and in splendid mountings (the finest collection in the world); an immense Egyptian collection; majolica, carved wood, bronze, ivory, furniture, and tapestries.

Lov'at, Simon Fraser (thirteenth Lord), abt. 1667-1747; Scottish Jacobite; b. near Inverness; succeeded to the title, 1699; was outlawed for marrying his cousin's widow by force to secure the estates left by him; went to France; embraced the cause of James II; and became a Roman Catholic. On the outbreak of the Jacobite insurrection, 1715, he was invited by his clanmen to espouse that cause,

but preferred to take the opposite course, inducing them to follow his guidance, for which service he was restored to his estates. In the insurrection of 1745 he sent his clan under his son to fight for the Pretender, while he protested his own loyalty to the House of Brunswick. This double dealing was unsuccessful, and he was executed on Tower Hill, London.

Love Bird, popular name for the small Old World parrots of the genus *Agapornis*, given them on account of their affection for one another. They are among the smallest of the parrots, being only 5 or 6 in. in length.

Love, Courts of, institutions in mediæval France, in which offenses against the laws of chivalric love were tried before judges (generally ladies), whose decisions were binding on all knights, and on the ladies in whose service they were.

Love'lace, Richard, 1618-58; English poet; b. Woolwich, Kent; graduated at Oxford in 1636; became courtier of Charles I, and colonel in the royal army during the great rebellion; served also in the French army. He was twice imprisoned in England, and solaced his lonely hours by the composition of amatory verses, the most familiar of which are the fine lyrics "To Althea, from Prison," and "To Lucrecia, on Going to the Wars."

Love Feasts. See AGAPÆ.

Love'joy, Elijah Parish, 1802-37; American abolitionist; b. at Albion, Me.; was graduated from Waterville College in 1826; became in 1827 a teacher, and in 1828 an editor at St. Louis, Mo.; studied theology at Princeton, N. J., and in 1833 was ordained a Presbyterian minister. In 1836, while editor of the *St. Louis Observer*, attacked slavery so vigorously through its columns that he was compelled by a mob to remove to Alton, Ill.; here, on the night of November 7, 1837, he was shot dead.

Low'ell, John, 1710-78; American educator; b. Boston, Mass.; was master of the Boston Latin School from 1734 to its suppression by the siege of Boston, 1775. During this period "Master Lovell" was the instructor of many men eminent in the Revolutionary annals, but he was himself a loyalist, and embarked with the British troops for Halifax, Nova Scotia, where he died. He delivered the address at the dedication of Faneuil Hall, 1743.

Low'er, Samuel, 1797-1868; Irish author; b. Dublin; wrote songs and set them to music; published a volume of "Legends and Stories of Ireland" abt. 1830, and a second series, 1834; and in the meantime became a portrait and miniature painter. His works include "Songs and Ballads," 1839; "Handy Andy," 1842; "Rory O'More," "Treasure Trove," 1844, and "Metrical Tales and Other Poems," 1859. He also wrote successful plays, operas, and extravaganzas. In 1844 he began to recite and sing his own works in public, visited the U. S., 1847-48.

Low, substantive used in connection with weather maps as an abbreviation for an area of

low pressure; is equivalent to cyclone, without the popular associations of violence connected with the latter.

Low Archipel'ago, or Paumo'tu Islands. See TUAMOTU.

Low Coun'tries. See NETHERLANDS.

Lowe, Sir Hudson, 1769-1844; British soldier; b. Galway, Ireland; served in the expedition to Egypt; in the Peninsular War, in Naples, and Sicily; aided in the conquest of the Ionian Islands; became their first governor; was present at the battle of Bautzen, and carried to London the news of the abdication of Napoleon, for which he was knighted and promoted to major general; is remembered chiefly as governor of the island of St. Helena during the imprisonment of Napoleon.

Low'ell, James Russell, 1819-91; American author and diplomatist; b. Cambridge, Mass.; son of Rev. Charles Lowell, 1782-1861; graduated at Harvard College, 1838, as class poet, and at Harvard Law School, 1840; began practice in Boston, but soon devoted himself entirely to literature. He printed, 1841, a small volume of poems entitled "A Year's Life"; edited with Robert Carter, 1843, *The Pioneer, a Literary and Critical Magazine*, which reached only three numbers; published, 1844, "A Legend of Brittany"; 1845, "Conversations on some of the Old Poets" and "The Vision of Sir Launfal"; 1848, "A Fable for Critics," and "The Biglow Papers," satirical essays in dialect poetry directed against slavery and the war with Mexico, which acquired wide popularity both at home and abroad. In 1851-52 he traveled in Europe; delivered, 1854-55, a course of lectures on the British poets before the Lowell Institute, Boston; succeeded Longfellow, 1855, as Prof. of Modern Languages and Literature at Harvard College.

From 1857-62 he was editor of *The Atlantic Monthly*, and, 1863-72, of *The North American Review*. He published, 1864, "Fireside Travels"; 1866, a new series of "Biglow Papers"; 1869, "Under the Willows," with which was included his noble "Commemoration Ode" in honor of the alumni of Harvard who had fallen in the Civil War, and "The Cathedral"; 1870 and 1871 two volumes of essays, "Among my Books" and "My Study Windows." He again visited Europe in 1872-74, receiving in person the degree of D.C.L. at Oxford and LL.D. at the Univ. of Cambridge, England. He was U. S. minister to Spain, 1877, and to England, 1880-85; was elected lord rector of St. Andrews Univ., Glasgow, Scotland, 1884, but resigned the position as incompatible with his office as U. S. Minister. "Democracy and Other Addresses" was published, 1887; "Heartsease and Rue" and "Political Essays," 1888; "American Ideas for English Readers," "Latest Literary Essays," and "Old English Dramatists" were issued posthumously, 1892.

Lowell, Maria (WHITE), 1821-53; American poet; b. Watertown, Mass.; married James Russell Lowell, 1844; best poems, "The Alpine Shepherd" and "The Morning Glory." Her death, which took place the same night that

one of Mr. Longfellow's children was born, called forth from Longfellow his poem beginning:

"Two angels, one of life and one of death,
Passed o'er our village, as the morning
broke."

Lowell, one of the capitals of Middlesex Co., Mass., and one of the most noted manufacturing cities of the U. S.; at the junction of the Merrimac and Concord rivers; 26 m. NW. of Boston. It contains several villages, derives immense water power from Pawtucket Falls, in the Merrimac, and has been noted for its cotton manufactures since 1823, when the first mill was erected. According to the U. S. census of 1909, the city had 320 "factory-system" manufacturing plants, as against 256 establishments in 1904, and employing about 32,600 wage earners, and yielding products valued at \$80,271,000. The chief manufactures are cotton and woolen goods, hosiery, carpets, patent medicine, furniture, leather, tools, and various kinds of machinery. Noteworthy institutions include a state normal school, Lowell Textile School, St. John's and Lowell hospitals, old ladies' home, St. Peter's and Theodore Edson orphanages, Rogers High School, city hall, and courthouse. The city owns real and personal property exceeding \$8,900,000 in value, and has an assessed property valuation of over \$80,000,000. Pop. (1910) 106,294.

Low'er, Richard, abt. 1631-91; English physician; b. Cornwall; was the first to perform successfully the operation of transfusion of blood on a living animal, which he did on a dog abt. 1665.

Low German, Germanic dialects spoken on the continent of Europe, which, in distinction from High German and Midland German, have not undergone a second shifting of consonants. Low German is divided into Low Saxon and Low Frankish, the latter being confined to the Netherlands and to the N. part of Belgium.

Lowndes (lowndz), Rawlins, 1722-1800; American lawyer; b. British W. Indies; studied law in Charleston, S. C., and, 1766, was appointed by the crown associate judge. In 1775 he was elected a member of the Council of Safety, and of the committee appointed under it. In 1776 he was one of a committee of eleven appointed to draft a constitution for S. Carolina, and subsequently a member of the Legislative Council. In 1778 he was elected president of the state. He exerted himself to resist the advance of the British forces, and after the capture of Charleston was for some time a prisoner. In the State Assembly he strenuously opposed the acceptance of the Federal Constitution.

Lowth, Robert, 1710-87; English biblical scholar; b. Winchester; son of Rev. William Lowth, theologian, 1661-1732; took holy orders, 1735; became Prof. of Poetry at Oxford, 1741, and delivered a course of lectures on the "Sacred Poetry of the Hebrews," the foundation of his later work on the same subject;

became Bishop of St. David's, 1766; was translated to the See of Oxford the same year, and was appointed Bishop of London, 1777; declined the archbishopric of Canterbury, 1783.

Loyola (loi-yô'lä), Saint Ignatius de, 1491-1556; founder of the Society of Jesus; b. Guipuzcoa, Spain; in youth was a page at the court of Ferdinand and Isabella; accompanied the king in his wars; became a prisoner and cripple at battle of Pamplona; and turned his thoughts toward a religious life while convalescing. Conceiving the design of a spiritual militia with its headquarters at Jerusalem, he made a pilgrimage to that city, afterwards studied at Alcalá and at the Univ. of Paris, where he gathered a few followers, and received priest's orders at Venice, June 24, 1537. In 1538 he went to Rome with his companions, and unfolded his plans to Pope Paul III. A bull for the establishment of the new order was granted, September 27, 1540, and in the following spring Ignatius was unanimously chosen general. His subsequent history is that of his order. See JESUITS.

Loyson (lwä-zôn'), Charles (better known as **PÈRE HYACINTHE**), 1827-1912; French ecclesiastic; b. Orleans; became Prof. of Theology in several colleges, a Carmelite monk, and one of the most celebrated preachers ever heard at Bordeaux, Nantes, and in Notre Dame, Paris. While at the latter a suspicion of his orthodoxy grew up, and, 1869, he was commanded by the general of his order at Rome to change his manner of speech or to be silent. To this he replied in a letter, in which he declared his conviction that if France and the Latin races were given up to social, moral, and religious anarchy, the principal cause was not Catholicism itself, but the manner in which Catholicism had been for a long time understood and practiced. This letter created much commotion in the religious world and caused the excommunication of its author. He visited the U. S., 1869; was a member of the Old Catholic Congress, 1871; married an American lady in London, 1872; was appointed a curate of the Old Catholic Church in Geneva, 1873; and established an independent church in Paris, 1878.

Luala'ba Riv'er, stream which rises on the S. frontier of the Kongo Independent State; was long thought to be the head source of the Kongo, but the explorations of Delcommune and Bia, 1892, show that the more E. Luapula has its head fountains much farther from the mouth of the Kongo and contributes to it a much larger volume of water than the Luabala, which is now regarded merely as a tributary of the Kongo.

Lub'bock, Sir John. See AVEBURY.

Lübeck, free Hanse town and important commercial port of the former German Empire; on the Trave; 10 m. from its entrance into the Baltic; is almost surrounded with water; is still partly surrounded with walls; and contains many old-fashioned houses and churches, which remind one of the Middle

Ages. It is divided into four quarters—that of Jacobi to the NE., of Maria Magdalena to the NW., of Maria to the SW., and of Johannis to the SE. The most important square is the market place, in the center of the city. Here stands the town house, a large structure, built of red and black glazed brick, with five towers, finished 1517. This building contains the Hanse Hall, in which in olden times, when Lübeck stood at the head of the Hansa, the representatives from German cities held their assemblies, but which is now divided into a number of smaller rooms; and the town cellar, built 1443 and stocked with excellent wine. Among the churches the Lutheran Marienkirche is the most striking, built between 1286 and 1310, in a severe Gothic style, with three naves and two tall belfries.

The cathedral, built between 1170 and 1341; the Jacobikirche, of the thirteenth century; and the Petrikirche, from the beginning of the twelfth, are interesting. The Katharinenkirche, built in the earliest Gothic style, is not used now for worship, but contains a collection of art and antiquities. Noteworthy among the other buildings are the house of the Merchants' Company, the Hospital of the Holy Ghost, with a beautiful chapel in the earliest Gothic style; the theater, the lunatic asylum, the Katharineum, the School of Navigation, the Mercantile Academy, etc. Breweries, manufactures of tobacco, cloth, linen and cotton, and silk-weaving factories are in operation. Still more important is the commerce, on account of the location of the city, between Hamburg and the Baltic; about 2,300 vessels enter the harbor annually. Lübeck was founded, near the site of a more ancient Slavic town of the same name which had been destroyed, by Adolphus II, Count of Holstein, and was ceded by him, 1158, to Henry the Lion, who promulgated the code known as *das Lübsche Recht*. It became an imperial free city and the capital of the Hanse towns. During the Thirty Years' War it lost its prestige, and during the Napoleonic wars it was subjected to many vicissitudes. Pop. (1910) 116,599.

Lu'can, George Charles Bingham (third Earl of), 1800–88; British general; b. London; entered the army, 1816; accompanied the Russian army as a volunteer in the Turkish War of 1828–29; succeeded to the title and large estates in Ireland, 1839; became a representative peer, 1840; was commander of a cavalry division in the Crimea, and made himself memorable by his connection with the charge of the Light Brigade at Balaklava, October 25, 1854; became lieutenant general, 1858; general, 1865; field marshal, 1887.

Luca'nia, ancient division of Magna Græcia; extended from the Tarantine Gulf in the E. to the Tyrrhenian Sea in the W.; most remarkable of its cities were Sybaris, Heraclea, and Pæstum; now corresponds to the provinces of Basilicata and Principato Ultra.

Lu'cas van Leyden. See LEYDEN.

Lucayos (lō-kī'ōs). See BAHAMA ISLANDS.

Lucca (lō'kū), city of Italy; capital of province of same name; on the Serchio; about 15

m. NE. of Pisa; is in a fertile plain, surrounded, except on the E., by spurs of the Apennines, and the views from the ramparts of the town are charming. The public buildings contain many choice works of art, especially pictures by Fra Bartolomeo and other great masters. The cathedral was erected in the eleventh century; the rich façade was added, 1204. Lucca, originally Etruscan, passed first to the Ligurians, then to the Romans (abt. 180 years B.C.); was governed by a duke under the Lombards; became a free state, 1055; was again under a duke (the renowned Castruccio Castracani), 1327; and, 1370, once more recovered its liberty. In 1805 Napoleon made it a principality for the benefit of his sister Eliza, and, 1815, it fell to Maria Theresa of Spain, whose son ceded it to Tuscany. In 1860 it was annexed to Sardinia, and is now one of the fairest portions of the Kingdom of Italy. Silk was manufactured here as early as the latter part of the eleventh century. Pop. (1901) 74,971.

Lucerne', one of the most beautiful cities of Switzerland; capital of the canton of Lucerne; on the Reuss; at the N. end of Lake Lucerne; has some remarkable churches and a celebrated monument called the Lion of Lucerne, carved in the solid rock after a model of Thorwaldsen, in remembrance of the Swiss Guard butchered in Paris, August 10, 1792. Pop. (1908) 35,433.

Lucerne, Lake of, lake of Switzerland; inclosed by the cantons of Uri, Unterwalden, Schwytz, and Lucerne; is 22 m. long, from $\frac{1}{2}$ to 2 m. broad, and perhaps the most beautiful sheet of fresh water in Europe.

Lu'cerne, leguminous forage plant (*Medicago sativa*); a native of Europe, where, as in the U. S. and other regions, it is extensively sown. Considerable care is requisite in the early stages of its growth, but when well established, if sown on good but light soil, it will produce a greater amount of green forage than almost any other plant, and the quality is unsurpassed. It is perennial, and is cut several times in the season. In California it is known by the Spanish name of alfalfa, and is much prized.

Lu'cian, abt. 120–200 A.D.; Greek humorist; b. Samosata, Syria; became a lawyer; meeting with little success as an advocate at Antioch, visited the greater part of Greece, Italy, and Gaul, giving lectures in the cities. On returning to his native country, he applied himself to writing, but still traveled occasionally, visiting Ionia and Achaia about 160 or 165, and Paphlagonia about 170. In his latter days he was appointed procurator of part of Egypt, where he died. His best-known works are his "Dialogues," directed against the gods, philosophers, and absurdities of paganism. In the "Sale of the Philosophers" the founders of the different sects are put up at auction, Mercury being the auctioneer. "The Banquet," or "The Lapithæ," is one of the most humorous of all Lucian's dialogues. The "Dialogues of the Dead" have found numerous and distinguished modern imitators.

Lucian, Saint, abt. 250-312; Christian theologian; b. Samosata, Upper Syria; became a teacher at Edessa and Antioch, inculcating a doctrine similar to that afterwards known as Arianism; was three times excommunicated as a heretic; ultimately retracted his heterodox doctrines, and died a martyr in Nicomedia in the persecution of Maximin; was the author of a revision of the Septuagint much valued by the Eastern churches.

Lu'cifer, d. abt. 371; religious controversialist; became Bishop of Cagliari, Sardinia; appeared at the Council of Milan, 354, as the legate of Pope Liberius, but opposed the Arians in so violent a manner that the Emperor Constantius threw him into prison and carried him from place to place for several years. After the death of Constantius he was liberated, and took up his residence in Syria, but here, too, he deepened the controversy which took place in the Church of Antioch between the Catholic Church and the Arians. Disapproved by his own former friends, he left Antioch and retired to Sardinia, where he founded the sect of the Luciferians, whose chief characteristic was hostility to Arianism.

Lucifer, or **Phos'phorus** (Latin and Greek, the light bringer), classic name of the planet Venus when it is the morning star, Vesper or Hesperus being its name when seen in the evening. In mythology, Lucifer was the son of Astræus and Aurora, and, together with the Hours, had charge of the horses and chariot of the sun. Also, one of the names applied to the devil. It occurs in the old versions in Isaiah xiv, 12, where the King of Babylon is compared with the morning star. The use of the name has been confirmed in literature by Milton in "Paradise Lost."

Lucil'ius, Caius, 148-103 B.C.; Latin poet; b. Suessa, Campania; was one of the fathers of Latin poetry, and, if not the inventor of Roman satire, was at least the first to give it the form afterward developed by Horace, Persius, and Juvenal. His satires consisted of 30 books, of which over 800 fragments are still extant, the longest of them extending to only 13 verses.

Luci'na, in Roman mythology, the goddess who was supposed to preside at the birth of children. According to Hesiod, she was a daughter of Jupiter and a sister of Hebe and Mars, but in later times she was regarded as identical with Juno and Diana. Her principal places of worship were Rome, Crete, and Athens.

Luckner (lòk'nér), Nicholas, 1722-94; marshal of France; b. Kampen, Bavaria; distinguished himself in the Prussian army during the Seven Years' War, and became a lieutenant general in the French army, 1763, and marshal, 1791. Early in 1792 he captured Courtrai and Menin. In July he obtained the chief command of the three armies in the field, and, August 19th, combated the Austrians near Valenciennes. Subsequently he was accused of treason, and summarily tried and executed.

Luck'now, city of British India; capital of a district and division in the united provinces of Agra and Oudh; on the Gumti, an affluent of the Ganges; 610 m. from Calcutta. At some distance the city presents a magnificent aspect, but it disappoints on a nearer approach. The whole central part of it consists of narrow and crooked streets, sunk several feet into the ground, and lined with huts of mud or bamboo, thatched with straw or palm leaves. The commercial part of the city, along the river, which here is 100 yards wide, navigable for large boats, and crossed by three bridges, is better built; it has brick houses surrounded with gardens. In the E. quarter are several mosques and palaces, among which the Imambara is the most remarkable; is an extensive structure, containing a mosque, the sepulcher of Asof-ud-Dowla, a college, etc.; but several parts of it are of a most beautiful architecture. Lucknow manufactures much gold and silver brocade, and its muslins and other fabrics are held in high esteem.

From 1775, and to the incorporation of the Kingdom of Oudh with the British dominions, Lucknow was the capital of the country. The mutiny of 1857 broke out at Lucknow early in May, and from July 1st to September 25th the feeble garrison of European forces under Sir Henry Lawrence withstood the large besieging party of mutineers, during which time Sir Henry was killed. On the latter date they were relieved by the forces under Gens. Outram and Havelock, who cut their way in, but were in turn themselves besieged by the still greatly superior force of the natives; and it was not until November 17th that Sir Colin Campbell arrived to their relief with reinforcements. The city, however, could not be held, and was secretly evacuated on the 22d. It was not until March 19, 1858, and after much hard fighting, that the city, which had been fortified by the insurgents, was repossessed by the British. Pop. (1901) 264,049.

Luzon (lò-zôn'). See **LUZON**.

Lucre'tia, daughter of Spurius Lucretius Tricipitinus and wife of Lucius Tarquinius Collatinus; celebrated as much for her virtue as for her beauty. Sextus Tarquinius, a son of Tarquinius Superbus, King of Rome, and a kinsman of her husband, became passionately enamored of her, and once, having been hospitably received in her house during the absence of Collatinus, he entered her bedchamber in the night with a drawn sword, threatened to lay a slave with his throat cut beside her, and say that he had killed him in order to avenge her husband's honor, thus compelling her to yield to his wishes. As soon as he had departed she sent for her father and husband, told them what had happened, made them swear to avenge her, and then stabbed herself. When the deed became known it aroused the whole people, and Lucretia's funeral became the occasion of a general revolution, by which the Tarquins were expelled from Rome and the republic was established.

Lucretius (TITUS LUCRETIIUS CARUS), 95-52 B.C.; Roman philosophical poet; was driven mad by a philter; composed in his intervals of

reason several works which were revised by Cicero; and died by his own hand; is known only as the author of "De Rerum Natura," which is by universal consent the greatest of didactic poems. It is in heroic verse, extends to 7,400 lines, and is designed to develop clearly and to illustrate in an attractive way the atomic theory of the universe.

Lucullus, surname of a plebeian family of the gens Licinia, which first appears in history at the close of the second Punic War. The most famous member of this family was Lucius Licinius Lucullus, the conqueror of Mithridates; abt. 109-57 B.C.; served in the social war, and accompanied Sulla to Greece and Asia as questor on the outbreak of the first Mithridatic War, 88. During the siege of Athens he collected a naval force from the allies of Rome, and defeated the fleet of Mithridates off the coast of Tenedos. In 80 he returned to Rome to fill the office of curule ædile, to which he had been elected, together with his younger brother, Marcus. In 74 he was consul with M. Aurelius Cotta, and, having been appointed to conduct the second war against Mithridates, he carried it on for eight years with almost invariable success, and was prevented from bringing it to a triumphant conclusion only by the insubordination of his own soldiers. At length the Manilian law was enacted, which deprived Lucullus of his command and gave it to his rival, Pompey. He returned to Rome, and spent the rest of his life in retirement. His name became proverbial for studied and extravagant luxury; a single dinner cost him \$10,000. But his life was not limited to sensual pleasures; he enjoyed the conversation of philosophers, patronized literature, and allowed the public to enjoy his library.

Lu'ders, Alexander Nicolaievitch (Count), 1790-1874; Russian general of German family; was engaged in the war in Finland, 1808; took part in the campaigns of 1812-14 against Napoleon; led a brigade in Poland, and distinguished himself at the taking of Warsaw, 1831; served in the Caucasus, 1843-45; commanded successfully against Bem in the Hungarian War, 1849; was given the superior command in the Crimea, 1856; and was preparing to carry on the war when it was ended; was lieutenant general of Poland, 1861; made count, 1862.

Lud'low, town in county of Shropshire, England; at the confluence of the Corve and Teme; 23 m. S. of Shrewsbury; has a castle, formerly an important stronghold against the Welsh, the residence of Henry VII (1485-1509), and of Mary Tudor before her accession to the throne, and still more memorable as the scene of the representation of Milton's "Comus." It was held for Charles I (1646), but surrendered to the Parliamentary forces, soon after fell into decay, and is now a ruin. Pop. (1901) 4,522.

Ludol'phus, Job, 1624-1704; German Orientalist; b. Erfurt; author of numerous works relating especially to Ethiopia and its language.

Ludwig (lôd'vîg) I, or **Lou'is I** (KARL AUGUST), 1786-1868; King of Bavaria; b. Strassburg; while prince gave his time and attention to literature and art instead of politics. The famous collection of sculpture, the Glyptothek, was made by him, and many of the finest buildings of Munich were constructed under his direction. He came to the throne, 1825, and, though he introduced some economic reforms and continued his patronage of fine arts, his subjection to ultramontane influence, his disregard for constitutional rights, and the scandal caused by his liaison with Lola Montez made his rule most unpopular. After the revolutionary disturbances in the spring of 1848 he resigned in favor of his son, Maximilian Joseph.

Ludwig II, **Otho Friedrich Wilhelm**, 1845-86; King of Bavaria; b. Nymphenburg; succeeded his father, Maximilian II, 1864; took the part of Austria in the war against Prussia, 1866; sided with Prussia in the Franco-German War, 1870-71; is believed to have first suggested a new German empire under King William of Prussia; subsequently avoided his people and publicity; became the patron of Richard Wagner; undertook to duplicate the most striking features of the architecture of Paris and Versailles in almost inaccessible parts of his kingdom; was deposed for insanity; and drowned himself three days later.

Lugano (lô-gû'nô), Lake of, body of water on the frontier between Switzerland and Italy and between Lago Maggiore and Lago di Como; is of irregular shape, 20 m. long, but nowhere more than 1½ m. broad; surrounding scenery is grand and wild.

Luini (lô-s'nê), or **Lovini (lô-vê'nê)**, **Bernardino**, d. after 1530; Italian painter; b. Luino; is said to have been a pupil of Leonardo da Vinci, but this is disputed. His best pictures are in Milan, Lugano, and Saronno. In elaborate finish, beauty of color, and expression they are hardly inferior to the works of Leonardo, for which they are often mistaken. His frescoes are among the finest early specimens of the arts.

Luitpold (lô't-pôlt), **Charles Joseph, William Ludwig** (Prince), 1821-1912; Regent of Bavaria; b. Würzburg; third son of Ludwig I; married Princess Augusta, Archduchess of Austria, 1844; was appointed regent, June 10, 1886, on the deposition of the insane King Ludwig II. Prince Otto, the nominal successor of Ludwig, was also insane, and Luitpold continued as regent.

Luitprand (lô't-prând), or **Liutprand (li-ô't-prând)**, abt. 690-744; King of Lombardy; succeeded his father, Ansprand, 712. His wise laws remained in force in N. Italy till the thirteenth century, and in the Kingdom of Naples till the sixteenth. In 728 he wrested from the Greeks the exarchate of Ravenna and all the provinces N. of Rome. This led to a conflict with Pope Gregory II, who dreaded the increase of the Lombard power. In 739 he went with an army to the succor of Charles Martel in France, and drove the Saracens out of Provence. On his return to Italy he once

more attacked the Greeks, who were leagued against him with Pope Gregory III. He laid siege to Rome, but desisted at the instance of Charles Martel. He left Lombardy powerful and prosperous, and was succeeded by his nephew, Hildebrand, who had ruled jointly with him from 736.

Luitprand, or **Liutprand**, abt. 920-72; Lombard historian; was a deacon of the Cathedral of Pavia, and afterward Chancellor of Berenger II, who sent him as ambassador to Constantinople. Having incurred the resentment of Berenger and his queen, 950, he fled to the court of the Emperor Otho I, who, 961, appointed him Bishop of Cremona and sent him to Rome. He was sent again as ambassador to Constantinople, 968 and 971. His principal works are a chronicle of events, 960-64, and a general history of Europe, abt. 888-948.

Luke, Saint, evangelist, author of the third Gospel, and, according to ecclesiastical tradition, also of the Acts of the Apostles. The name appears only three times in the New Testament. If these passages refer to the author of the gospel, he was a physician and a collaborator of St. Paul. If Luke was also the author of the Acts, he was, 52 A.D., with Paul in Troas, and accompanied him thence as far as Philippi. He followed Paul on his third missionary tour, and was with him again when he was sent as a prisoner to Rome. The silence of the apostolic fathers concerning the Gospel of Luke indicates that it was admitted into the canon somewhat late. As the occasion for writing his gospel, the author himself mentions (i, 3, 4) his desire to give his friend Theophilus a faithful narrative of the life of Christ. Recently the opinion that it was composed after the destruction of Jerusalem has found advocates in different theological parties. The Acts are likewise addressed to Theophilus.

Lull, Ramon (Latinized RAIMUNDUS LULLIUS), 1235-1315; Spanish scholastic and alchemist; b. at Palma, in Majorca, or at Barcelona; led a dissolute life till the age of thirty, when he renounced the world and devoted himself to philosophy and religion. After many pilgrimages he settled in a hermitage on Mt. Roda, near Barcelona, and studied Latin and Arabic, Hebrew and Chaldee, theology and philosophy. Here he formed his system of religious and philosophical belief, and produced his first literary compositions. His works in Catalan are very voluminous, but we only know a few minor poetical compositions and "Reynard the Fox," designed for the political instruction of rulers, but wholly different from the Dutch and French fables with the same title. The religious romance "Evas and Blanquena" was in Latin. He passed the latter half of his life as an itinerant apostle of philosophical and religious truth. He even made several voyages to Moorish Africa, where he convoked the leading Mussulman doctors and exposed the fallacies of Averrhoes and the hollowness of the pretensions of Mohammed. In the last of these missions, at the age of eighty, he was put to death at Bougah by a

mob as an enemy to the religion of the Prophet.

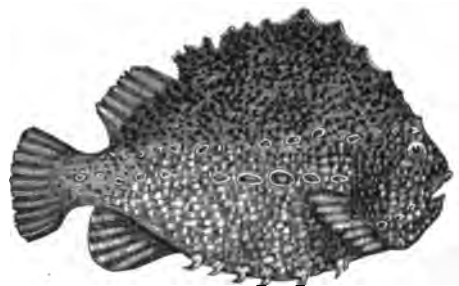
Lull'y, Jean Baptiste, 1633-87; French composer; b. Florence, Italy; went early to Paris as scullion in the household of the Princess of Montpensier; made himself noticed by his skill on the violin, and obtained a place in the orchestra of Louis XIV. He soon organized another orchestra, of which he was made director, and next was made director of music at the court. In 1672 he opened an opera theater at Paris, and became the founder of the French opera. He wrote nineteen large operas, but at present his music is practically never heard.

Lumba'go, or **Crick in the Back**, a very painful ailment; a kind of subacute rheumatism, often very severe, and seated in the lumbar region. Strong liniments, rubbing with the hand, the application of the electrical brush, and cupping are all useful. A mild diaphoretic often affords relief.

Lum'ber. See **TIMBER AND TIMBER TREES**.

Lumines'cence, emission of light at temperatures below that of ordinary incandescence, or the emission of light at any temperature which is not wholly due to the effect of that temperature alone. Luminescence embraces a variety of phenomena which have been known under the names of fluorescence and phosphorescence.

Lump Fish, or **Lump Suck'er**, fish (*Cyclopterus lumpus*) found in the N. Atlantic, N. from Long Island and France; has an elevated ridge along the back, covered with a notched



LUMP FISH (*Cyclopterus lumpus*).

and tuberculated skin not unlike the comb of a cock; has its ventral fins formed into a sucker, by which it can cling to any solid substance.

Lu'na, Latin name for the moon, and in Roman mythology the goddess of the moon. Her worship was common to the Romans with other Italic peoples. At Rome there were two old temples to Luna, one on the Palatine, called *Noctiluca* (i.e., which is illuminated by night), and another on the Aventine above the Circus Maximus, founded apparently by Servius Tullius. As the goddess of the months, Luna was worshiped on the last day of March, which was the first month of the old Roman year.

Lu'nacy. See **INSANITY**.

Lunahilo (lō-nā-lō'lo), William Charles, 1835-74; King of Hawaii; b. Honolulu; received a good education, but afterwards his dissipated life made him unfit for offices of trust; died without an heir and without appointing a successor.

Lu'nar Caus'tic. See SILVER, NITRATE OF.

Lunar, or Meton'ic, Cy'cle, period of nineteen solar years, containing two hundred and thirty-five lunar months and six thousand nine hundred and forty days. Ordinary years were divided into twelve months, comprising three hundred and fifty-four or three hundred and fifty-five days, and leap years into thirteen, with three hundred and eighty-four days. This astronomical period was adopted by the Greeks 432 B.C. It was the first exact calendar in general use, and in using the moon for measuring months nothing could be better. In it the differences from the exact periods of the celestial bodies are everywhere reduced to a minimum, and at the end of the cycle there is a difference of only + nine hours thirty-five minutes from nineteen solar years, and of seven hours twenty-nine minutes from two hundred and thirty-five lunar months. Calippus attempted to overcome these inaccuracies by taking four Metonic cycles, and omitting one day in the fourth, which rendered his calendar similar to the subsequent Julian calendar. With this correction the lunar cycle is the best calendar except the Gregorian, over which it has the advantage that each month agrees with the cycle of phases within less than a day. The lunar cycle was in use in Greece, Macedonia, Asia Minor, and other countries. The Jewish calendar is based on it.

Lun'dy, Benjamin, 1789-1839; American antislavery agitator; b. Hardwich, N. J.; was a saddler by trade; settled in St. Clairsville, Ohio, where he organized the Union Humane Society, an antislavery association; removed to St. Louis, 1819, where by contributions to the press he continued his philanthropic efforts. In 1821 he began, at Mt. Pleasant, Ohio, *The Genius of Universal Emancipation*, which was afterwards transferred to Jonesboro, Tenn., and, 1824, to Baltimore, Md. In 1836 he started a weekly antislavery journal, *The National Enquirer*, in Philadelphia. He was the first to establish antislavery periodicals and to deliver antislavery lectures.

Lundy's Lane, Bat'tle of, called also that of Bridgewater or Niagara; battle fought in Canada near Niagara Falls, July 25, 1814. Col. Winfield Scott, of the U. S. army, defeated Gen. Riall, of the British army, with a superior force and a battery, turning the British left, and capturing Riall and his staff, as well as the battery. The Americans lost 743, the British 878.

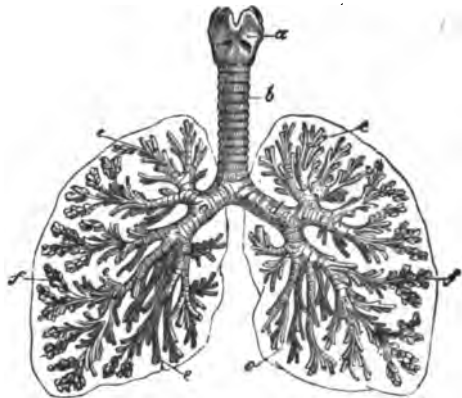
Lune, in spherical geometry, the portion of a spherical surface included between two great semicircles. The two semicircles are the sides of the lune, and the angle of the lune is the angle between the planes of its sides. This angle may have any value between 0° and 360°.

In plane geometry a lune is the portion of a plane included between the arcs of two circles that intersect. The lune of Hippocrates is famous as being the first curvilinear space whose area was exactly determined.

Lunéville (lō-nā-vél'), town of France; department of Meurthe; at the confluence of the Vezouse and the Meurthe; is one of the largest cavalry stations of France. It is historically notable from the Peace of Lunéville, February 9, 1801, by which the Rhine became the frontier of France; has manufactures of gloves and cotton, and an extensive trade in corn, wine, brandy, and hemp. Pop. (1900) 23,269.

Lung Fe'ver. See PNEUMONIA.

Lungs, organs by which, in air-breathing vertebrate animals, the blood is aerated and certain gaseous impurities are removed from it. In the Invertebrata and fishes and the larvæ of Batrachia the lungs are functionally represented by gills and by other analogous organs. In many fishes there is in addition to the gills a "swim bladder," which structurally represents the lungs, and which, in a few species, appears to share in the function of the true respiratory organs. Some Batrachians



ARRANGEMENT OF AIR PASSAGES IN THE HUMAN LUNGS.
a, Larynx. b, Trachea. c, d, Bronchi. e, Bronchial tubes. f, Lobules.

have both gills and lungs. The true reptiles all have lungs, and many of them breathe by gulping down a large quantity of air by a kind of swallowing process not much like the breathing of mammals. The left lung of serpents is either wanting or very rudimentary. In birds the respiratory function appears to be shared by the lining membranes of the extensive air chambers in the bones, etc. The lungs of all the Mammalia are in plan much like those of man.

The human lungs (*pulmones*, *pneumones*) are two, one being placed in each of the lateral cavities of the thorax, and they are separated from each other by the mediastinum and its contents. The apex or top of each lung extends above the first rib. The right lung is larger and broader, but shorter, than the left. It has three lobes—the left but two. The

blood vessels, air tubes (bronchi), nerves, lymphatics, etc., enter each lung at a point called the *hilum*; and these structures, with the connective tissue, constitute what is called the *root* of the lung, a part of the mediastinum. The lungs are of light, spongy texture. The *outer* covering is a reflection of the pleura, and is a *serous* membrane. The *inner* membrane of the air passages and cells is embryologically derived from the alimentary canal, and hence is a *mucous* membrane. The substance of the lungs is composed of lobules, each containing a branch of the bronchial tube and a cluster of air vesicles or *alveoli*.

Lungwort (*pulmonaria officinalis*), a perennial herb of the borage family, a native of Europe, and frequently found in old gardens. The spotted leaves were supposed by the old herbalists to resemble diseased lungs, and thus indi-



LUNGWORT (*Pulmonaria officinalis*).

cate its value in pulmonary diseases; but it is, like some others of the family, simply mucilaginous. Smooth lungwort (*Mertensia Virginica*) is indigenous in New York and to the S.; its flowers are of a beautiful blue, and the plant is worthy of a place in the finest garden.

Lupercalia, great festival anciently held in Rome and other Italian towns on February 15th, in honor of the god variously called Faunus, Inuus, and Lupercus. At Rome the Lupercalia were celebrated at a place called the Lupercal. The original design was to propitiate the god and secure fertility to human beings, flocks, and fields. The festivities had an indecent, rude, and savage character. After a sacrificial feast, the members of the two colleges of the Luperci ran around the Palatine Hill, striking women who placed themselves in their way with thongs cut from the skins of the slaughtered victims—a rite efficacious, it was believed, to cure barrenness. The thongs were called *februa*, and hence the month was called February.

Lupine (lŭ'pĭn), any herb of the large genus *Lupinus* of the family *Leguminosæ*. There are numerous species in the U. S., chiefly found W.

of the Rocky Mountains. These species are prized mostly in cultivation for their handsome papilionaceous flowers. Many of the Old World species are cultivated as forage plants, and their seeds are used as food for man.

Lu'pus, term comprising two distinct diseases of the skin, which most commonly attack the face, and begin as red and slightly or considerably elevated spots, afterwards growing slowly to considerable dimensions. The benign form, *Lupus erythematosus*, causes little local or general disorder, and is amenable to treatment. The severer disease, *L. vulgaris*, is tuberculosis of the skin. It is characterized by dull-red nodules, which later break down and cause destructive ulcers.

Lupus Serva'tus. See SERVATUS LUPUS.

Luray, capital of Page Co., Va.; near the Shenandoah River; 100 m. SW. of Washington. About a mile W. of the village is a remarkable cavern, discovered, 1878. The whole area occupied by it, with its innumerable chambers, often arranged in tiers, is about 100 acres, of which, however, only a comparatively small part has been fully explored. Pop. (1900) 1,147.

Lu'siad (Os LUSIADAS), epic poem of Portugal, so called after the mythological hero Lusius. It was written by Camoëns between 1556 and 1571, and celebrates, in ten cantos, the glories of the Portuguese conquests in India and other events in the history of Portugal.

Lusa'tia, ancient territory of Germany, bounded by Bohemia, Saxony, Brandenburg, and Silesia. Originally it formed two independent margraviates. Upper and Lower Lusatia, which, 1635, came into the possession of Saxony, but by the Congress of Vienna, 1815, the greatest part of the territory was transferred to Prussia.

Lusita'nia, name of the extreme SW. of the three provinces into which the Iberian Peninsula was divided by the Romans, comprising the present Portugal S. of the Douro and a considerable portion of the adjacent provinces of Spain.

"Lusitania," name of a great Cunard liner which, on its regular voyage from New York, with over 1900 persons on board, was sunk by a German submarine off Old Head of Kinsale, May 7, 1915, with a loss of 1,154 lives, of whom 114 were Americans. The German government set up a claim that the steamship was armed and carrying ammunition for its enemies, and had caused a warning against taking passage on the vessel to be published in a New York newspaper the morning the vessel sailed (May 1).

Lustra'tion, among the ancient Romans, ceremonial purification by water, blood of sacrificial victims, or other means. Similar rites were performed by other peoples of antiquity.

Lus'trum, ceremonial purification (see LUSTRATION) of the Roman people, performed by the censor every five years with peculiar rites,

as follows: All men of military age were collected in the Campus Martius, and about them was carried on spears a sacrifice consisting of a boar, a sheep, and a bull, which was then offered to Mars by the censor in fulfillment of the vows made by his predecessor. The completion of this rite, including the deposit of a register of citizens in the public treasury and the driving of a nail into the wall of the Temple of Mars as a record of the event, was looked upon as necessary to give validity to the acts of the censor. From the fact that the lustrum was performed every five years the word came to mean a similar period.

Lute, ancient instrument consisting of a table, a body, a neck (for fingering) with frets, a head with screws for tuning, and a bridge on which ran the strings, from six to twenty-four in number. The frets were touched with the left hand, the strings with the right. It was long a favorite instrument in nearly all parts of Europe.

Lu'ther, Martin, 1483-1546; German reformer; b. Eisleben, Saxony; son of a councillor of the town of Mansfeld, but of peasant stock; was educated at the Univ. of Erfurt, taking his master's degree, 1505; entered the Augustinian monastery the same year; was ordained priest, 1507. In 1508 he was called to the Univ. of Wittenberg, where he lectured on philosophy; 1509, to the Univ. of Erfurt, but returned to Wittenberg as Prof. of Theology. In 1511 he went to Rome on business connected with the Augustinian order; 1512, became Doctor of Theology; 1515, combined with his professional work the duties of provincial vicar of his order for Meissen and Thuringia. He now began to preach against the sale of indulgences by the Dominican Tetzel, and having protested to the bishops in vain, proposed a public discussion, October 31, 1517, and nailed to the door of the castle church in Wittenberg ninety-five theses, the general purport of which was to deny the pope's right to forgive sins.

He was summoned to Rome, but the elector of Saxony demanded that he be tried on German soil. In 1520 he published an "Address to the Christian Nobles of the German Nation" and "On the Babylonian Captivity of the Church of God." In June, 1520, came his excommunication, and the burning in various places of his writings, followed, December 10th, by Luther's burning of the bull in the presence of his students, near Elster gate at Wittenberg. On the succeeding April 17th and 18th he appeared before the Emperor Charles V at the Diet of Worms, and refused to recant, ending with the words: "Here I stand. I cannot do otherwise. God help me." On his return from Worms (May 4th) he was seized by friends in disguise and carried to the Wartburg Castle for security, where, under the name of Junker Georg, he employed his time in preparing various works for publication, chiefly his lectures on the Gospels and Epistles, and the translation of the New Testament.

In 1522 he returned to Wittenberg, where he quelled disorders caused by fanatical "proph-

ets" from Zwickan, and, with Melanchthon's aid, revised his translation of the New Testament (published in that year), and began a translation of the Old Testament. His efforts for the reformation of the mass, or public church service, which are embodied in his "Formula Missae," began 1523. This was followed by his publication of translated and original hymns for public worship. He married, 1525, Catherine von Bora, who had been a nun. A "large" and a "small" catechism were published, 1529, and an edition of his hymns which contained the well-known "Ein feste Burg," 1528. An unsuccessful attempt to form a union between Luther and Zwingli took place at Marburg, 1529. Luther participated in repeated negotiations which were held in succeeding years among the Protestant parties, such as those that resulted in the so-called Wittenberg Concord. In 1537 he determined to dispel forever any hopes of reconciliation with the papacy. He published the translation of the whole Bible, 1541. Died at Eisleben, and was buried in front of the pulpit in the castle church at Wittenberg.

Lutheran Church, church which has been known by various titles. Her own earliest preference was for the name "Evangelical," 1525. From 1529 to 1648 the followers of Luther were officially called Protestants, and in Europe that term still to a large extent designates them exclusively. The name Lutheran was first used by Eck, and was applied to all who took part against the pope. Luther disapproved of the name, and the Church uses it with a protest. The distinctive characteristics of Lutheranism, as against the Church of Rome, belong to Protestantism. The Evangelical Lutheran Church regards the Word of God, the canonical Scriptures, as the only law of faith and life. The only creeds to which the Lutheran Church gives a universal recognition are the ecumenical creeds and the Augsburg Confession. The Lutheran Church regards preaching as an indispensable part of divine service. All worship is to be in a tongue understood by those who use it. The Church year, with its great festivals, is kept. Persons are received to the communion of the Church by confirmation. The ministry is not an order, but a divinely appointed office. The government by superintendents and consistories has been very general, but the latest tendency has been to synods, although the ultimate source of power is in the congregations. The right to choose a pastor belongs to the people. Synods possess such powers as the congregations delegate to them, and lay representation is universal.

Some of the points in which Lutheranism differs from the Reformed or Calvinistic portions of Protestantism are these: The Protestantism of the Reformed or Calvinistic churches has laid as its fundamental doctrine the absolute and sole primary causality of God. Election is therefore the material principle. The Lutheran system, with its faith reposing on the historical fact of the redemption, holds the mean between Calvinism and Romanism—

between the transcendent idealism of the one, the external realism of the other.

The earliest Lutherans in America came from Holland, and were among the first settlers of New Amsterdam. The first Lutheran church in Pennsylvania was built 1646. In 1748 the Lutheran Synod of N. America, afterwards known as the Evangelical Lutheran Ministerium of Pennsylvania and Adjacent States, was organized in Philadelphia. The General Synod, whose strength is mainly in the Middle States, was formed 1821. The General Council, which includes the two oldest synods in the U. S., *viz.*, the ministeriums of Pennsylvania and New York, was organized 1866. The Synodical Conference, which consists of the large synods of Missouri and Wisconsin, with a few small synods, all German, was organized 1870. The United Synod of the South dates from 1886. In the Synodical Conferences the government approaches that of the purer forms of Congregationalism, while in the General Synod, United Synod, and a large part of the General Council it has more points in common with Presbyterianism. Synods have, according to the Missouri conception, a purely advisory power; but outside of the Synodical Conference greater weight is placed on their decisions. The total number of Lutherans in the world is probably about 52,000,000. In the U. S., 1908, they had 13,169 churches and 2,022,605 communicants.

Lütke (lüt'kêh), **Fedor Petrovitch**, 1797-1882; Russian explorer; was educated in the Russian navy; accompanied Capt. Golownin on his circumnavigation of the earth, 1817-19; undertook, 1821-24, four expeditions to Nova Zembla; explored Bering's Strait and the Sea of Kamchatka, 1826-29; 1835, was made an admiral. He was the founder of the Russian Geographical Society, and attained the seat in the French Institute which had stood vacant since the death of Franklin.

Lüt'zen, small town of Prussian province of Saxony; about 10 m. SE. of Merseburg. On November 16, 1632, the Swedish king Gustavus Adolphus fell here in a battle with Wallenstein, the general of the imperial army; the Swedes were victorious. On May 2, 1813, Napoleon defeated the Prussian and Russian armies near the town.

Lux (lôks), **Adam**, 1766-93; German enthusiast; b. Bavaria; was a teacher at Mentz; became an ardent partisan of the French Revolution; was elected to the Rhenish-German convention, and, 1793, represented it, together with George Forster, in the French convention. The fate of the Girondists, and especially of Charlotte Corday, incited him to publish violent pamphlets, in which he denounced the terrorists and challenged them to put him to death; and they had him executed.

Luxembourg (lûks-ân-bôr'), **François Henri de Montmorency-Bouteville** (Duc de), 1628-95; French soldier; posthumous son of François de Montmorency, Comte de Bouteville; first saw service under the great Condé, at the siege of Lérida; and for gallantry at the bat-

tle of Lens, although but twenty years of age, was made *maréchal de camp*. Soon after he married Madeleine, heiress and representative of the dukes of Luxembourg-Pinei, a title which he thereupon assumed. In 1668, as lieutenant general, he aided Condé in the conquest of Franche-Comté. In the campaign of 1672 he held chief command in the Dutch Netherlands, and showed himself a skillful general, ending it by a brilliant retreat with 20,000 men in the face of 70,000. He fought under Condé at the battle of Senef, 1674, and, 1675, was appointed a marshal of France, and commander in chief after the death of Turenne. He captured Valenciennes and Cambrai, aided in gaining the battle of Cassel, and forced the Prince of Orange to raise the siege of Charleroi. He was confined for fourteen months in the Bastille on absurd charges of poisoning, but was released, 1680, with an unspotted character, though forbidden to reside within 20 leagues of Paris. After ten years of disgrace, he was appointed to command the army destined for the invasion of Flanders, and won the battles of Fleurus (1690), Leutze (1692), and Steenkerk (1692), and defeated William III at Neerwinden (1693).

Luxemburg (lûks'ém-bêrg), **Adolphus William Charles Augustus Frederick** (Grand Duke of), 1817-1905; b. at Biebrich; was Duke of Nassau and became Grand Duke of Luxembourg on the death of William III of Holland, 1890. He was one of the wealthiest princes in Europe; children, Prince William Alexander, only son, born 1852, and Princess Hilda, married, 1885, to the Crown Prince Frederick of Baden.

Luxemburg, or **Lux'embourg**, territory between Rhenish Prussia, France, and Belgium; formed originally a duchy, which alternately belonged to Burgundy, Spain, Austria, France, and Holland. By the Congress of Vienna, 1815, it was made a grand duchy, and, forming a part of the Germanic Confederation, was given to the King of the Netherlands as a compensation for Nassau. When, 1830, Belgium organized itself into an independent kingdom, a large part of the territory was transferred to her, of which it now forms a province. This part contains the districts of Arlon, Neuchâteau, and Marche, and comprises an area of 1,706 sq. m., with (1900) 219,210 inhabitants, most of whom speak French. The grand duchy of Luxembourg comprises an area of 998 sq. m. with 246,455 inhabitants, most of whom speak German. It was joined to Holland by a personal union, the King of the Netherlands being also Grand Duke of Luxembourg. In January, 1919, Grand Duchess Marie, who had refused to entertain the German Emperor, abdicated the throne in favor of her sister, Princess Charlotte, and the Chamber of Deputies proposed a referendum to decide whether the form of government should be changed to a republic.

Luxemburg, capital of the grand duchy of Luxembourg; on the Else or Alsette; 42 m. N. of Metz; was at one time the strongest fortress in Europe, next to Gibraltar. By the Treaty of London, 1867, it was declared neutral ground, the fortifications were demolished, and the space was laid out in streets and

promenades. The city has cotton manufactures, distilleries, tanneries, and trade in leather and woolen goods. Pop. (1900) 20,928.

Luxor, village in upper Egypt, on the E. bank of the Nile, at which steamers stop to allow tourists to visit the site of ancient Thebes; contains one of the five large temples for which Thebes was noted, but its splendor is overshadowed by its greater neighbor at Karnak, 2 m. to the NE. The N. extensions of the original building are inclined away from the river in order to bring them more into line with the temple at Karnak, with which Luxor was connected by an avenue of sphinxes. Pop. abt. 11,000.

Luynes (lü-ën'), **Charles d'Albert** (Duc de), 1578-1621; French courtier; b. Pont St.-Esprit, Gard; was descended from a Florentine family, Alberti by name, which, having bought the estate of Luynes, in Touraine, had assumed its name and title. He became the favorite of the dauphin, afterwards Louis XIII, and after the court revolution, 1617, instigated by him, was made a duke and peer of France. He married the daughter of the Duc de Montbazou, was made constable and Chancellor, and exercised for a short time absolute control over the whole government.

Luzerne (lü-zärn'), **Anne Cesar** (Chevalier de la), 1741-91; French diplomatist; b. Paris; attained the rank of major general of cavalry, 1762, with the colonelcy of the Grenadiers de France. He was sent as minister to the court of Bavaria, 1776, and to the U. S. as successor to Gerard after the recognition by France of the independence of the united colonies, 1778. He resided in Philadelphia, 1779-83, giving proofs of prudence and friendship for the struggling colonists, which gave him a considerable influence in the direction of affairs. In 1780 he contracted on his own responsibility a loan for the relief of the army. In 1782 he obtained the postponement of the ratification by Congress of the treaty of peace with Great Britain until that between Great Britain and France should be signed. Pennsylvania gave him name to one of her counties.

Luzon, largest of the Philippine Islands; in the Malayan Archipelago; between the Chinese Sea and the Pacific Ocean; area, 40,969 sq. m.; pop. (1903), 3,798,500. The ground is mountainous, several ranges of a height from 4,000 to 7,000 ft. traversing the island from N. to S. There are several active volcanoes, among which is Mayon (7,566 ft.); earthquakes are frequent and destructive. The climate is hot and moist; vegetation is luxuriant; immense forests of trees yielding valuable woods cover the mountains. The principal rivers are the Grande de Cagayan, Agno, Abra, and Grande de la Pampagna. Rice, wheat, maize, sugar, cotton, indigo, tobacco, coffee, ginger, pepper, and vanilla are raised in abundance; the orange, lemon, citron, banana, cocoa, breadfruit, pineapple, and tamarind grow wild. Gold, iron, copper, zinc, coal, rock salt, coal, marble, asphalt, and lead are among the minerals found. Rice, sugar, hemp, coffee, copra, tobacco, mother-of-pearl, amber, coral, and tor-

toise shell are exported. There are some manufactures; shipbuilding is extensively carried on; the grazing of cattle, horses, etc., is an important industry.

The principal native tribes are the Tagalogs (over 1,664,000), Bicoles or Vicoles, Ilocanos, Cagayanes, and Igorrotes. The Negritos, nomads of the mountains of the interior, are idolaters, and are believed to be the original inhabitants of the island. Many Chinese have settled here, but comparatively few Spaniards. The trade is mostly in the hands of English and American merchants established at Manila, the principal town. Luzon was discovered by Magellanes, 1521.

Lycanthropy, kind of madness in which the patient fancies that he is a wolf. The old and very widespread belief in the existence of man wolves possessed of the devil has in many instances lead deluded persons to fancy themselves thus possessed; and in not a few instances this fancy has become epidemic.

Lycaon, in Greek mythology, (1) a king of Arcadia, whose fifty sons were personifications of Arcadian cities. Zeus, whom they had offended by their impiety, slew Lycaon and all of his sons except Nyctinus, the youngest, whom Gaia (Earth) saved by seizing the uplifted hand of Zeus. Nyctinus became King of Arcadia, though the vengeance of heaven still pursued him, for it was in his reign that the flood of Deucalion was sent to devastate the world. (2) The father of Pandarus, who led the forces of Zelea to the support of the Trojans against the Greeks. (3) A son of Priam and Laethoe, half brother of Hector. He was slain by Achilles.

Lycaonia (lik-ä-ö'n-i-ä), province of Asia Minor between Galatia, Cappadocia, Cilicia, Pisidia, and Phrygia. Its boundaries changed often, and it was not until 321 A.D. that it became a fixed and separate province. In Byzantine times it was included in the Anatolic theme. It afterwards became the center of the Seldjuk Empire. Its principal town was Iconium (now Koniah).

Lyceum, largest of the three gymnasia of ancient Athens. None but well-born youth, whose parentage on both sides was Athenian, were allowed to be trained here. In 335 B.C. Aristotle was permitted to make use of the Lyceum as a place for teaching philosophy. His instruction was given while he walked in the groves which surrounded the Lyceum; hence his philosophy was called *Peripatetic* (walking about). The Lyceum stood on the E. side of the city, outside the gates, just S. of the Cynosarges. In France the public schools for secondary instruction have the name of lyceum (*lycée*).

Lychnis (lik'nis), name of a genus of annual or perennial plants found in Europe and the U. S., the commonest species of which is the corncockle (*Lychnis githago*). It belongs to the pink family. Several species are cultivated as garden flowers in the U. S., the best known being the scarlet lychnis (*L. chalcedonica*), sometimes called the Maltese cross, a native of N. Asia.

Lycia (lîs'î-ä), ancient region of Asia Minor of small extent, on the Mediterranean, between Mta. Taurus on the N., Climax on the E., and Dædala on the W.; noted cities, Xanthus, Patara, Pinara, Olympus, Myra, Tlos, and Telmissus. The most ancient name of the country, according to Herodotus, was Milyas, the inhabitants being of two races—Solymi and Termilæ or Tremilæ. Apollo was often called Lycian Apollo, from his temple at Patara, second in renown only to that at Delphi, and regarded by some as the place of his birth. The Solymi, doubtless the earliest inhabitants, and of Semitic stock, were conquered by the Tremilæ, who are said to have come from Crete and took the name of Lycians. The Lycians were conquered by Harpagus, the general of Cyrus. They took part in the revolt of the Asiatic Greeks, were subdued and made a satrapy of Persia, and furnished fifty ships to Xerxes for his invasion of Greece. Alexander the Great subdued the country almost at the outset of his Asiatic career; it was afterwards attached to the Syrian Empire, and was given to the Rhodians by the conquering Romans. Soon afterwards it became independent as a republican confederation of cities, but ultimately became a Roman province, with Myra as the capital. In the great civil war, on the death of Cæsar, Lycia espoused the cause of Octavius and Antony, and was conquered by Brutus after a desperate resistance.

Ly'con, abt. 300 B.C.—226; Greek philosopher; b. Phrygia; was a disciple of Strato, on whose death, 270, he became the head of the Peripatetic school in Athens, and for forty-four years presided at the Lyceum. None of his writings are extant, except perhaps a fragment of a work on characters.

Lyc'ophron, Greek poet and grammarian of the third century B.C.; b. Chalcis, Ubæa; was one of the seven poets, termed from their number Pleiades, who graced the court of Ptolemy Philadelphus. This king employed him to classify the works of the comic poets contained in the Alexandrian Library. Lycophron likewise composed a work on the history of Greek comedy and comic poets. Suidas has preserved the titles of twenty of his tragedies. His only extant poem, "Cassandra" or "Alexandra," is proverbial for obscurity.

Lycopodium (lî-kô-pô'dî-ûm), genus of cryptogamous plants popularly known as club mosses, the type of the small family *lycopodiaceæ*. They are low perennials, having something of the habit of the true mosses, and are found in all parts of the world. The common club moss, *Lycopodium clavatum*, which is widely distributed, is found in the U. S., E. of the Mississippi, and in Europe and N. Asia. The plant had formerly a reputation as a remedy in disease of the bladder, and is now of considerable importance on account of its spores, which are known in commerce as lycopodium.

Lycop'olis. See ASSIUT.

Lycur'gus, Spartan legislator; lived, according to the most common tradition, in the ninth century B.C., and was a son of King Eunomos;

ruled the country for some time during the minority of his nephew, Charilaos, but was afterwards compelled to emigrate; became on his return the founder of those institutions by which one of the most striking types of national character which history contains was developed in Sparta. Some modern scholars consider him a mythical person; but the Spartans themselves built a temple to his honor, and said that he brought his laws from Crete, and introduced them with the sanction of the Delphic oracle. The most prominent feature of Spartan society was the division into two classes or castes—the slaves, helots, who performed all the labor and had absolutely no rights; and the citizens, Spartans, who were completely exempted from labor, and owned and ruled the land. Only strong and well-formed children were allowed to live; the weak or deformed were exposed to die on Mt. Taygetus. The boy was educated by the state, which subjected him to the severest discipline. When he was thirty years old he was allowed to marry, but the state chose his wife, and, although married, he continued to live in garrison till his sixtieth year.

Lycurgus, abt. 396 B.C.—323; Attic orator; was elected guardian of the public revenue for a term of four years, 337, and continued in office for three consecutive terms, filling it so satisfactorily that seventeen years after his death a monument was erected reciting the ability with which he had discharged his office. He was also superintendent of the city and censor. He was one of the ten orators whose surrender was demanded by Alexander, but the people refused to give him up. All his orations have perished except that against Leocrates, and some fragments.

Lyd'da, ancient town of Palestine; within the tribe of Ephraim; on the road from Jerusalem to Joppa; 9 m. E. of the latter. In the Old Testament it bears the name of Lod, as also in the Apocrypha. It was destroyed by Cestus Gallus in his march against Jerusalem, rebuilt as capital of one of the nine toparchies of Judæa, and became the seat of a celebrated Jewish school of the law. Later it received the name of Diospolis; was the birthplace of the celebrated martyr St. George, the patron of England. It is still an extensive town under the name of Ludd.

Lyd'gate, John, abt. 1370—1450; English poet; b. Lydgate, Suffolk; became the head of a school at Bury St. Edmunds; wrote several poetical works—"The Fall of Princes," "The Storie of Thebes," and "The Historie, Siege, and Destruction of Troye"—which are chiefly valuable as monuments of the English language in that obscure period.

Lyd'ia, country of Asia Minor, whose boundaries varied much in different periods, though it may be bounded by Mysia, Phrygia, Caria, and Ionia (or the Ægean Sea). Of the three dynasties of Herodotus, two are purely fabulous. With the Merminadæ (founded by Gyges), the last of whom was Cræsus (overthrown by the Persians, 546 B.C.); we begin to touch historical times. Lydia was famous for

its wealth, which was gained chiefly by trade, for which the citizens had a natural aptitude. The Lydians invented coined money by imprinting on the rude ingot of gold or silver the official stamp of the state along with the mark of the king. The capital of Lydia was Sardes (now Sart), other cities of importance being Magnesia ad Sipylum (now Manissa), Thyateira (now Ak Hissar), Philadelphia (now Ala Shehir), and Hypaipa (now Birghe). The country is still very fertile, and produces a fine quality of tobacco.

Lyd'ian Stone, siliceous slate or flinty jasper of a velvet-black color, used as a touchstone for testing the quality of gold and silver.

Ly'ell, Sir Charles, 1797-1875; Scottish geologist; b. Kinnordy; became Prof. of Geology in King's College, London, 1832; president of the Geological Society of London, 1836 and 1850; knighted, 1848, and created baronet, 1864; works include "Principles of Geology," "Students' Manual of Geology," "Travels in North America," "A Second Visit to the United States," and "Geological Evidences of the Antiquity of Man." Though his direct contributions to knowledge were of great value, he is most widely known as the apostle of "uniformitarianism," the doctrine that the stupendous changes demonstrated by the structure of the earth's crust were accomplished slowly by the cumulative action of agencies still at work with undiminished energy.

Lyg'damis, b. abt. 580 B.C.; Tyrant of Naxos; aided in overthrowing the oligarchy, and obtained the chief power. During his absence to assist Pisistratus on his third return to Athens, there was a revolution in Naxos; but Pisistratus subdued it and made Lygdamis tyrant of the island, about 540; was put down, with other tyrants, by the Lacedæmonians.

Lygo'dium, genus of climbing ferns. There are a number of species, natives of warm countries, and extending to New Zealand, Japan, and N. America. Only one species (*Lygodium palmatum*) is found on the American continent; it extends from Massachusetts W. to Kentucky, and sparingly to the S. From its great delicacy and grace this fern is much used for decorative purposes in both the fresh and dried state.

Lyly, or Lilly (lil'i), John, abt. 1553-1606; English author; b. Weald of Kent; was reputed a rare wit and poet at the court of Elizabeth; published "Euphues, the Anatomy of Wit," and "Euphues and his England"; also produced eight plays, designed for representation by children at court; was engaged in the Mar-Prelate controversy; and wrote a pamphlet, "Pap with the Hatchet," against the Martinists. His "Endymion" and the song on Cupid and Campaspe are admired.

Ly'man, Phineas, abt. 1716-74; American soldier; b. Durham, Conn.; tutor in Yale, 1738-41; became a lawyer at Suffield; was influential in securing that town to Connecticut; appointed major general and commander in chief of the Connecticut forces in the French War;

built Fort Lyman (since called Fort Edward), N. Y.; succeeded Sir William Johnson in command at the battle of Lake George; was engaged in the attack on Ticonderoga, the capture of Crown Point, the surrender of Montreal, and the expedition against Havana, 1762; spent several years in England as agent to solicit lands for a colony in Florida, and died in W. Florida (now Mississippi).

Lyman, Theodore, 1833-97; American naturalist; b. Waltham, Mass.; became an assistant at the Cambridge Museum of Comparative Zoölogy; was Massachusetts Fish Commissioner, 1865-82, and made the first scientific experiments in fish culture undertaken by any state; president of the Boston Farm School, trustee of Peabody Education Fund and Peabody Museum of Archæology, overseer of Harvard University, 1868-80 and 1881-87, and member of Congress, 1883-85.

Lymph (limf), nearly transparent and colorless fluid found in the lymphatic or absorbent vessels in nearly all the organs and tissues of the body. They begin in the substance of the tissues either as clefts or minute but definite vessels, converge toward the central parts, uniting with each other into larger branches, which usually follow the same course as the corresponding blood vessels, pass through a series of small solid glandular organs, the "lymphatic glands," and finally empty into the venous system by two main trunks, viz., the "thoracic duct," bringing the lymph from the lower extremities, the trunk, and left upper portions, and emptying into the left subclavian vein; and the "right lymphatic duct," bringing the lymph from the right upper portions, and emptying into the right subclavian vein. The lymph cells, almost $\frac{1}{100}$ in. in diameter, are irregularly round masses of protoplasm with a nucleus. They originate principally in the lymphatic tissue through which the lymph current passes, and when they are poured by the great lymphatic trunks into the venous blood current, the lymph cells are thereafter known as the white corpuscles of the blood. The lymph contained within the absorbent vessels of the digestive tract during certain stages of digestion becomes mingled with the particles of oil taken up from the intestinal contents; the emulsion thus formed produces the temporary milky appearance of the fluid within the intestinal lymphatics, which, in recognition of this condition, is designated as chyle and the vessels often as lacteals. After the digestive processes are completed, the milky appearance disappears and the lymph within the absorbents of the intestines returns to its usual limpid condition.

Lynch, Thomas, Jr., 1749-79; American patriot; b. Prince George parish, S. C.; educated in Cambridge Univ. and studied law in London; became a captain in the S. Carolina provincial troops; succeeded his father in Congress, 1776, and was a signer of the Declaration of Independence; retired soon after because of ill health; and was lost at sea en route to France.

Lynchburg, city in Campbell Co., Va.; on the James River; 147 m. E. by N. of Richmond; is on the sides of a hill rising abruptly from the river, and presents a picturesque appearance with its numerous terraces and ornamental villa residences, which command a splendid view of the Blue Ridge and the Peaks of Otter, 20 m. distant. It is a central point for an extensive shipping and distributing business, has numerous manufactories of tobacco, several iron foundries, railway machine shops, cotton and flouring mills, and possesses a magnificent water power, while in the immediate vicinity vast deposits of coal and iron are found. The city was an important base of supplies for the Confederates during the Civil War, but early, 1865, Gen. Sheridan destroyed the canal and the railways leading into it. It is the seat of Randolph-Macon Woman's College and the Virginia Baptist Seminary. Pop. (1910) 29,494.

Lynch Law, as understood in the U. S., the practice of trying and punishing men, by unauthorized persons, without due process of law, and in violation of the right of the proper legal authorities to bring alleged offenders to trial for alleged crimes and offenses with which they are charged. The origin of this phrase has been variously accounted for. According to some authorities it was derived from the practice of Col. Charles Lynch, of Virginia, 1736-96, of executing without trial the members of a band of Tory marauders that infested the newly settled country. Another account derives the term from the summary methods taken by a planter named John Lynch to rid the region of outlaws and escaped slaves who took refuge in the Dismal Swamp. This may have been Col. Charles's brother, who founded the town of Lynchburg, Va., and who is said by some authorities to have been the original "Judge Lynch"; while others trace the phrase back to one Lynch who was sent to America to punish pirates abt. 1687, or to James Fitzstephens Lynch, mayor of Galway, Ireland, who, 1493, executed his own son for murder. A tradition of the Drake family of N. Carolina ascribes the phrase to the precipitate hanging, to prevent a rescue, of a Tory named Maj. Beard on Lynch Creek, Franklin Co., N. C. When it was found that the Tories were not in pursuit, the captors went through the forms of a court martial, and hanged the lifeless body in execution of its decree.

Lyndhurst (Lindhurst), John Singleton Copley (Baron), 1772-1863; British statesman; b. Boston, Mass.; son of the artist John Singleton Copley; went to England, 1775; was called to the bar at Lincoln's Inn, 1804; became chief justice of Chester, 1817; entered Parliament as a Tory, 1818; was knighted and made solicitor general, 1819; was counsel of George IV, 1820, in the trial of Queen Caroline; became attorney-general, 1824; sat in Parliament for Cambridge Univ., 1826; opposed Catholic emancipation; was raised to the peerage as Baron Lyndhurst and appointed lord chancellor, 1827, holding that office until 1830, a second

time, 1834-35, and again, 1841-46. He was possessed of great eloquence and continued to astonish the House by his speeches up to his ninetieth year. His denunciation of the aggressive policy of the Emperor Nicholas, 1853, created a European sensation, and, 1859, he attacked the policy of Napoleon III with equal effect.

Lynn, city in Essex Co., Mass.; on Massachusetts Bay; 11 m. NE. of Boston; contains several villages; is noted for its manufactures, chiefly shoes, morocco leather, and electrical supplies; and has several national and savings banks, Soldiers' Monument, public library, and Lynn Woods, a natural pleasure reservation of over 2,000 acres. Pop. (1910) 89,336.

Lynx, name given to several members of the cat family (*Felidae*), distinguished by the absence of the first upper premolar, by their tufted ears, and, with one exception, by their short, stubby tails. The fur is soft, gray, or reddish gray, more or less spotted and mottled, very thick and soft in N. species. With



CANADA LYNX.

the exception of the *Caracal*, the lynxes are all inhabitants of the N. hemisphere. Two well-marked species, *Lynx borealis* and *L. pardina*, occur in Europe and two in N. America, the bay lynx (*L. rufus*) and the Canada lynx (*L. canadensis*). Except that it is smaller, measuring about 3 ft. in length, this last is very similar to the animal found in N. Europe.

Ly'ou, Mary, 1797-1849; American educator; b. Buckland, Mass.; opened at S. Hadley, Mass., 1837, and presided over the Mount Holyoke Female Seminary (now college), on a plan combining domestic labor with moral and intellectual culture, till her death; published a pamphlet descriptive of the seminary and "The Missionary Offering."

Lyon, Matthew, 1746-1822; American politician; b. Wicklow Co., Ireland; emigrated to New York in boyhood; became, 1776, lieutenant in a company of "Green Mountain Boys," paymaster-colonel of militia, member of the

Legislature, and assistant judge; founded the town of Fairhaven, 1783; built saw and grist mills; established a forge; made paper from basswood; manufactured types, and issued a paper called *The Scourge of Aristocracy and Repository of Important Political Truth*; was elected to Congress, 1797, as a Jeffersonian; was, 1798, convicted of libel against Pres. Adams, fined \$1,000, and imprisoned four months in Vergennes jail, during which time he was reflected twice; narrowly escaped expulsion, first as a convicted felon, and afterwards on account of an altercation on the floor of the House with Roger Griswold, of Connecticut, resulting in blows; removed to Kentucky, 1801; was again member of Congress, 1803-11; built gunboats on speculation for the War of 1812, and became bankrupt; was appointed by Pres. Monroe, 1820, U. S. factor among the Cherokee Indians in Arkansas, and was elected delegate to Congress from that territory, but soon after died at Spadra Bluff, Ark.

Lyon, Nathaniel, 1819-61; U. S. army officer; b. Ashford, Conn.; graduated at West Point, 1841; served in the Florida and Mexican wars; at outbreak of the Civil War was in command of the arsenal at St. Louis, and broke up a camp of secessionists established by the Governor, C. F. Jackson. Jackson then assembled a force at Booneville, where he was routed (June 17, 1861) by Lyon, then brigadier general of volunteers. On August 2d Lyon defeated the Confederates under McCulloch at Dry Spring, near Springfield, and was killed in the battle at Wilson's Creek, August 10th. He bequeathed his property to the Government. His "Last Political Writings" were published, 1862.

Lyons, Edmund (first Baron Lyons of Christchurch), 1790-1858; British naval officer; b. Burton, Hampshire; descended from Gov. John Winthrop, of Massachusetts; entered the British navy in childhood; became a midshipman, 1803; was engaged, 1828, in the blockade of Navarino, Greece, then held by the Turks, and conveyed King Otho to Athens on the formation of the new kingdom; was knighted, and resided there as minister fourteen years. At the outbreak of the Crimean War he was appointed second in command of the Black Sea Squadron, became commander in chief, and distinguished himself by brilliant services, which procured him a peerage, 1856; became successively vice admiral and admiral, 1857.

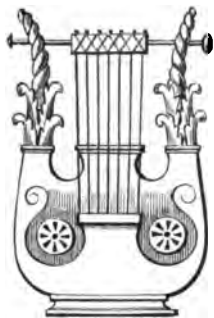
Lyons, third largest city of France and its most important manufacturing center; capital of the department of Rhône; at the confluence of the Saône and Rhone rivers; 315 m. SSE. of Paris; is the headquarters of one of the military divisions of France, and is strongly fortified, having eighteen detached forts forming a circle around it 16 m. in circuit. It consists of a central part, covering a peninsula formed by the two rivers, and a number of suburbs scattered over the hills on the right bank of the Saône and on the left bank of the Rhone. Twelve bridges span the Saône, seven the Rhone. Some quarters of the city and several

of the many public squares are handsome. Place Bellecour is one of the largest squares in Europe; on Place des Terreaux stood the guillotine, 1794; from the summit of the Hill of Fourvières, on the right bank of the Saône, where stands the Church of Notre Dame de Fourvières, a most magnificent view is presented of the city, the Alps to the one side and the Cévennes to the other. Among the public buildings the most remarkable are the Hôtel de Ville, one of the most beautiful buildings of its kind in Europe; the Palais des Beaux-Arts, on the Place des Terreaux; the cathedral, on the declivity of the Hill of Fourvières, in Gothic style of the time of Louis XI; the Church of St. Nizier, of the fourteenth century, etc. The educational and benevolent institutions of the city are numerous. The Royal College was founded, 1519, and enjoys a great reputation. The School of Drawing and the Veterinary School are model establishments. In the Martinière 220 sons of artisans receive gratuitous education. The dye works, foundries, glass houses, potteries, tanneries, and breweries of Lyons are very extensive, especially the latter. Its manufactures of jewelry, hats, fine liqueurs, and chemicals also are important, and its trade in its own manufactures and in the produce of the surrounding country, especially in wine, is very brisk; it communicates by canals with Bordeaux, Paris, Marseilles, Geneva, and the Rhine. Its principal business is its silk manufacture, in which branch of industry it is hardly surpassed by any other place in the world. The city is very old. The ancient *Lugdunum*, on the Hill of Fourvières (*Forum vetus*), was colonized, 43 B.C., by Munatius Plancus. Under Augustus it became the capital of the province of Gaul. Germanicus, Claudius, Marcus Aurelius, Caracalla, and Geta were born here. In the early Middle Ages it belonged to the Archbishop of Lyons. During the revolution it suffered terribly; its insurrection against the Convention was punished by Collot d'Herbois and Fouché with an unheard-of cruelty. After the fall of Robespierre the horrors were repeated. The terrorists and their adherents were drowned in the Rhone. Again, 1814, 1815, 1830, 1831, and finally, 1870-71, it was much disturbed by riots. Pop. (1906) 472,114.

Lyons, Gulf of, large bay formed by the Mediterranean on the S. coast of France; receives the Rhone; Marseilles and Toulon stand on its shores.

Lyre (lir), musical instrument of unknown origin and antiquity, famous in mythology and poetry. Diodorus ascribes its invention to the Egyptian Hermes (Mercury). According to the tradition, the Nile in its subsidence left on its banks a tortoise shell, the contents whereof were so dried by the sun that the hard-strained cartilage was like stretched catgut. This gave the hint of an instrument. The Greek tradition does not materially differ from the Egyptian. The improvements in the lyre were made by the Greeks, who increased the capacities of the instrument by adding to the

number of the strings. The most ancient lyre had three; the lyre of Terpander (680 B.C.), seven; the lyre of Pythagoras (600 B.C.), eight.



LYRE.

The number was afterwards increased. In the age of Sappho some had a compass of two octaves and more than twenty strings. In its perfected form the lyre consisted of two side pieces set upright, like horns, connected together near the top by a wooden cross-piece; the strings were attached to this, and stretched perpendicularly, the lower end being fastened to the bottom of the resonant shell.

They were struck with either the fingers or a plectrum, a stick of polished wood or ivory. When played, the lyre was held between the knees.

Lyre Bird, name given to three Australian birds (*Menura superba*, *M. victoriae*, and *M. alberti*) on account of the peculiarly shaped tail of the male. The outermost feather on either side curves outward like the sides of an ancient lyre, while the effect is heightened by



LYRE BIRD.

the fact that the two inner tail feathers are little more than mere shafts, and the twelve others have very sparse, slender barbs, thus suggesting the strings of the instrument. The lyre bird is about the size of a small fowl, has long, strong legs, and short weak wings. The general color is olive brown. It has a striking song, is very shy, and inhabits the dense thickets of New S. Wales.

Lyre Turtle, name applied to the largest of the sea turtles, *Dermochelys coriacea*, on account of its somewhat lyre-shaped outline, the strings of the instrument being suggested by the keels on the back. This turtle differs from all other living species in the fact that the carapace, instead of being composed of large,

regular plates of bone, related and united to the vertebræ and ribs, is formed of large numbers of thin, irregularly shaped pieces of bone, having no relation to the skeleton. This turtle attains a weight of 1,000 lbs.

Lys (lès), river which rises in France, in the department of Pas-de-Calais, flows in a NE. direction into Belgium, and joins the Scheldt at Ghent after a course of 125 m., of which 45 have been changed into a canal.

Lysan'der, d. 395 B.C.; Spartan general; received, 407, the command of the Spartan fleet, and defeated the Athenians off the promontory of Notium. His term of command having expired, he was replaced by Callicratidas, but Callicratidas was defeated, 406 B.C., in the battle of the Arginusæ; and as it was against the Spartan laws that the same person could hold an office twice, Aracus was nominally placed at the head of the fleet, while in reality Lysander held the command. His campaigns were very brilliant. He routed and captured the Athenian fleet at Ægospotami, and early in the next year (404 B.C.) took Athens, thus ending the Peloponnesian War. He was killed while besieging Haliartus.

Lys'ias, Syrian nobleman of the blood royal, whom King Antiochus Epiphanes, on setting out for Persia, appointed guardian of his son and regent of the kingdom, and as such he waged a formidable war with the Jews. His vast forces were defeated by Judas Maccabæus near Emmaus (166 B.C.), he was himself repulsed near Bethsura in the following year, but took that fortress, 163 B.C., and laid siege to Jerusalem, but by an insurrection at Antioch was forced to treat with the Jews. Shortly afterwards Lysias was put to death by the populace of Antioch, who had rebelled in favor of Demetrius Sotér.

Lysias, 458 B.C.-378; one of the canonical Attic orators, model of the "plain style"; son of Cephalus, a wealthy Syracusan, who had settled in Athens. In 443 he emigrated with an Athenian colony to Thurii, Italy, but, 413, was expelled with 300 others by the partisans of Sparta. He returned to Athens, 411, where he was imprisoned as an enemy of the oligarchs, but effected his escape. From Megara he sent much aid to Thrasybulus against the Thirty Tyrants; on their overthrow, 403, returned to Athens; and thenceforth chiefly devoted himself to the composition of speeches for parties engaged in litigation, sometimes pleading in person. Out of more than 400 orations ascribed to him, only thirty-five are extant.

Lysimachus (lî-sîm'ă-kûs), abt. 360 B.C.-281; King of Thrace; b. Pella, Macedonia; served as a general in the army of Alexander the Great, and received Thrace on the division of the empire at the death of Alexander, 323. In 306 he assumed the title of king, and having defeated Antiochus in the battle of Ipsus, 301, united a large part of Asia Minor to his dominions. An expedition he undertook, 292, against the Getæ, N. of the Danube, was unfortunate; he was taken prisoner with his

whole army, and received his freedom only by giving his daughter in marriage to the King of the Getæ. After the murder of his son Agathocles, who was much loved, the population of Asia Minor rose in insurrection, and was supported by Seleucus, and in the battle of Corupedion, Lysimachus was defeated and killed.

Lysip'pus, Greek sculptor; b. Sicyon; flourished in the fourth century B.C.; became especially celebrated for his statues of Alexander the Great, he being the only sculptor, as Apelles was the only painter, to whom Alexander would sit. Pliny tells us that Lysippus made about 1,500 pieces, but as he always worked in bronze, his works have all perished.

Lys'tra, ancient city of Asia Minor, placed by Pliny in Galatia and by Ptolemy in Isauria, while in the Acts of the Apostles it is placed in Lycaonia. It was the native place of Timothy; the scene of Paul's miracle of healing a lame man; of the attempted worship of Paul and Barnabas as Jupiter and Mercurius; and of the stoning of the former (Acts xiv). The site of Lystra has been disputed by modern travelers.

Lyte (lit), **Henry Francis**, 1793-1847; Scottish hymn writer; b. Ednam, near Kelso; ordained, 1815, and appointed to the curacy of Lower Brixham, Devon, 1823; wrote many popular hymns, among them "Abide with me; fast falls the eventide," etc.

Lyt'telton, **George** (first Baron), 1709-73; British statesman and author; b. Hagley, Worcestershire; son of Sir Thomas Lyttelton; entered Parliament, 1735; joined the young "Patriots," who eventually drove Walpole from power, and soon figured with Pitt and Pulteney among the most formidable opponents of the ministry; became secretary to

Frederick, Prince of Wales; succeeded to the baronetcy, 1751; became successively cofferer of the king's household, privy councillor, and Chancellor of the Exchequer, 1755. He was raised to the peerage, 1756, with the title of Baron Lyttelton of Frankley. His works include "Letters from a Persian in England," "Observations on the Conversion and Apostleship of St. Paul," "Dialogues of the Dead," "History of Henry II," and a number of poems.

Lyt'tleton, **Thomas**. See **LITTELTON**, **THOMAS**.

Lyt'ton, **Edward George Earle Lytton Bulwer** (first Baron). See **BULWER**.

Lytton, **Edward Robert Bulwer-Lytton** (Earl), 1831-91; English poet and statesman; b. London; son of Lord Lytton, the novelist; entered the diplomatic service, 1849, as *attaché* and secretary to his uncle, Sir Henry Bulwer, minister at Washington; later served as *attaché* at The Hague, St. Petersburg, Constantinople, and Vienna; was consul general at Belgrade, 1860; subsequently was secretary of legation, *chargé d'affaires*, secretary of embassy, at Constantinople, Athens, Madrid, Vienna, Paris, and other cities. He was appointed ambassador at Lisbon, 1874; was Viceroy of India, 1876-80; succeeded to the title as Baron Lytton, 1873, and was promoted to an earldom, 1880; was ambassador to France, 1887-91. In literature he was known as "Owen Meredith." His works include: "Clytemnestra and Other Poems," "Lucile," a novel in verse; "The Ring of Amasis," a prose romance; "Chronicles and Characters," "Fables in Song," "Orval, or the Fool of Time," "After Paradise," "Julian Fane, a Memoir." He published his father's speeches, also his "Life, Letters and Literary Remains."

M

M, thirteenth letter and tenth consonant of the English alphabet. The form of the character, like that of the other English letters, is ultimately derived, though with modifications, from the ancient Phœnician. The letter M in English has in all positions one uniform, well-known sound. It is often called a liquid or semivowel, and is a labial nasal, having the same relation to the labial mutes as *n* to the lingual mutes, and *ng* to the palatal mutes. See **ABBREVIATIONS**.

Maa. See **MAT**.

Maaa. See **MEUSE**.

Mab, fairy, celebrated by Shakespeare and other English poets. According to Voss, she is improperly called Queen Mab, from a misunderstanding of the old English word *qween* or *qwean* (A. S. *cwen*, woman).

Mably (mā-blē'), **Gabriel Bonnot de**, 1709-85; French publicist; b. Grenoble; family name **BONNOT**. Like his younger brother, the philosopher Condillac, he was ordained, but was secretly employed in affairs of state by his relative, Cardinal de Tencin, minister of

Louis XV, until a quarrel terminated the relation. In 1748 appeared his "Droit public de l'Europe," which achieved a remarkable success, and was followed by numerous historical disquisitions. He visited Poland, 1771, at the request of its government, to prepare a code of laws, and published, 1781, "Du gouvernement de la Pologne." He was also consulted by the American Congress on the preparation of the Federal Constitution, and embodied his views in his "Observations sur le gouvernement et les lois des États-Unis d'Amérique." Later philosophers have generally agreed in tracing the rudimentary ideas of modern communism in his "Entretiens de Phocion," "De la Législation," and "Principes de Morale."

Macad'am, **John Loudon**, 1756-1836; Scottish engineer; b. Ayr; settled in New York, 1770, where during the Revolution he was agent for the sale of prizes; returned to Scotland, 1783, and became a trustee of the roads and deputy lord lieutenant of Ayrshire. Between 1798 and 1815 he traveled 30,000 m. and spent more than five years and £5,000 in investigating the roads of Great Britain. In

1811 he made a communication to a committee of the House of Commons on the subject, containing the outlines of his system and directions for repairing roads. In 1815 he was appointed surveyor general of the trust or district of roads of Bristol, and, 1816, commenced carrying his system into operation. In a few years, out of the 25,600 m. of public roads in the kingdom, nearly seven tenths were macadamized; and at his death it is believed that there were not 250 m. of the whole not macadamized.

McAll', Robert Whitaker, 1821-93; Anglo-French philanthropist; b. Macclesfield; pastor of Congregational churches in England for twenty-three years; established the McAll Mission in Paris, 1872, and directed it till his death; work was extended till it comprised over 100 stations in Paris and various parts of France and a mission boat which plies on the inland waters of the country. A few years after the founding of the mission the French Society for the Promotion of Education and the Society for the Encouragement of Well-doing bestowed gold medals on Dr. McAll, and, 1892, the French Govt. conferred on him the cross of the Legion of Honor.

Macao (mă-kă'ō), city and seaport on the coast of China, in province of Kwangtung; belonging to Portugal, and situated on a peninsula of the Island of Macao at the mouth of the Canton River, 40 m. W. of Hong Kong. The Portuguese established a factory here, 1517; obtained a grant of the place from the Chinese emperor, 1586, and made it the seat of a very extensive trade; but since the establishment of the English at Hong Kong its commerce has much decreased, though it was made a free port, 1846. The coolie trade was the chief business until abolished in 1874. Camoens resided here, and wrote his "Lusiad"; an adjacent cave is still pointed out as a favorite place of his. Pop. (1899) 63,991.

Macaque (mă-kăk'), common name for various Old World monkeys of the genus *Macacus*,



PIG-TAILED MACAQUE.

characterized by a projecting muzzle, cheek pouches, and large ischial callosities. In some

macaques the tail is longer than the body, but in many it is very short, while in the Barbary ape it is entirely wanting. This species is a native of Africa, but a few are found on the Rock of Gibraltar, being the only monkeys found wild in Europe. All other macaques are found in Asia or the adjacent islands.

Macaro'ni, article of food made from very white and glutinous varieties of wheat, such as are grown in Russia, Italy, and California. The wheat is ground by a peculiar process, being first wet and then heated. The flour resulting is very coarse. It is mixed with warm water and worked into a paste. This paste is forced by a press through holes in an iron plate. If the holes are small, *vermicelli* is thus formed. A still finer and smaller sort is *fedelini*. Large pipe-shaped cylinders of this paste constitute *macaroni*. When the paste is rolled thin and cut into various shapes, *Italian paste* is the result. After molding, the macaroni is partially baked. Italy is the principal seat of this manufacture. France and England produce a considerable quantity, and a few firms in the U. S. produce an article equal to any of the imported kinds.

Macaron'ic Po'etry, originally a species of verse in which words of a modern language furnished with Latin terminations were intermingled; afterwards, in general, any verses exhibiting a medley of languages. The invention of macaronics is usually attributed to Teofilo Folengo, called Merlino Coccajo (1491-1544), a learned and witty Benedictine. They existed before him, but he first gave to them poetic excellence.

McAr'thur, Duncan, 1772-1839; American pioneer; b. Dutchess Co., N. Y.; was a ranger or scout in Kentucky and Ohio from abt. 1790 until the victory of Gen. Wayne, 1794; soon afterwards settled in Ohio as a surveyor, and became a member of the legislature and major general of the territorial militia: in War of 1812 was a brigadier general, and, 1814, succeeded Gen. Harrison in command of the Army of the West, and partly accomplished a bold plan of conquering Upper Canada; was a member of Congress, 1823-25, and Governor of Ohio, 1830-33.

Macart'ney, George (first Earl), 1737-1806; British diplomatist; b. near Belfast, Ireland; was sent as envoy extraordinary to the Court of Russia, 1765; made Chief Secretary for Ireland, 1769; distinguished himself in the Irish Parliament; was Governor of the Island of Grenada, 1775-79, and of Madras, 1780-86. In 1792 he was appointed ambassador extraordinary to the Court of Peking, being the first English envoy ever sent to China, and was afterwards the first British Governor of the Cape of Good Hope. In 1776 he was created baron; 1792, viscount; and, 1794, Earl Macartney in the Irish peerage; and, 1796, he received a British barony.

Macas'sar, town of Celebes; on the Strait of Macassar; is the capital not only of the government of Macassar, but of all the Dutch possessions in Celebes and of many neighbor-

ing islands. Next to Batavia it is the most important Dutch center in the E. Indies. The residence of the governor is surrounded by walls and ditches, and defended by Fort Rotterdam. Its harbor is spacious and safe, and its trade, especially in tortoise shell, edible nests, ebony, sandalwood, rice, and spices, is large. An oil, so called because originally obtained here, was formerly used in dressing the hair. The native inhabitants of the town and government of Macassar are Mohammedans, and are considered the most gifted and civilized tribe of the Malayan race. Pop. abt. 20,000.

Macassar, Strait of, passage of water separating Borneo from Celebes, varying in breadth from 50 to 150 m.; navigation difficult on account of shoals and rocks.

Macaulay, Sir James Buchanan, 1793-1859; Canadian jurist; b. Niagara, Ontario; fought during the War of 1812; was admitted to the bar, 1822; executive councilor during the administration of Sir Peregrine Maitland; became judge of the Court of Queen's Bench, 1829; chief justice of the Court of Common Pleas, 1849-56, and shortly before his death was appointed judge of the Court of Error and Appeal. The statutes of Upper Canada were consolidated, 1858, under his supervision and largely by his aid; knighted, 1859.

Macaulay, Thomas Babington (Baron Macaulay of Rothley), 1800-59; English historian; b. Rothley Temple, Leicestershire; son of Zachary Macaulay, eminent as a philanthropist; gained the Chancellor's medal at Cambridge, 1819, for a poem on "Pompeii," and again, 1820, for one on "Evening"; took the second Craven scholarship at Trinity College, 1821; was chosen to a fellowship, 1822. His debut as a writer was made in the columns of *The Quarterly Magazine*, and for twenty years thereafter he was a constant writer for that periodical. His brilliant essay on "Milton," published in *The Edinburgh Review*, 1825, gave him celebrity as a critic. He was called to the bar, 1826, but seems never to have practiced, and soon devoted all his energy to the service of the Whig Party. In 1828 he was appointed a commissioner of bankruptcy; in 1830 Lord Lansdowne procured his election to Parliament from the pocket borough of Calne; in 1833 he sat as member for Leeds.

He was appointed secretary to the board of control, 1833, but resigned that office and his seat in Parliament to become legal member of the Supreme Council of India. Returning, 1838, he was elected to Parliament from Edinburgh, and was Secretary of War in the Melbourne ministry, with a seat in the Cabinet, 1839-41. On the return of the Whigs to power, 1846, he was made paymaster of the forces, but having supported the Maynooth grant (to Maynooth College, Ireland), he was defeated, 1847. In 1849 Macaulay was chosen lord rector of the Univ. of Glasgow; 1852, was returned to Parliament from Edinburgh; 1857, was made a peer of the realm, and was chosen a foreign associate member of the French Academy. He was buried in Westminster Abbey.

His works comprise "History of England," "Lays of Ancient Rome," and "Essays."

Macaw, large parrots of the genus *Ara* or *Sittace*, forming the subfamily *Arineæ*, a group peculiar to S. America. With one or two exceptions they are distinguished by their size, their enormous beaks, long tails, and gaudy



BLUE AND YELLOW MACAW.

colors, in which brilliant red, blue, and yellow are conspicuous. Their voice is loud and harsh, and they do not learn to talk well. The great blue macaw (*Ara ararauna*), which is about 3 ft. long, bright blue above and equally vivid yellow below, is a well-known example of the group.

Macbeth, Scottish chieftain of the eleventh century; hero of one of Shakespeare's tragedies. King Duncan invaded Thorfinn's territories in the N. of Scotland, which were defended by Macbeth, who killed Duncan near Elgin, 1039. Macbeth was then proclaimed king of Scotland. In 1054 he was defeated near Dunsinane by an English force under Siward, Earl of Northumberland; and, 1056 or 1057, was killed at Lumphanan by Macduff and Malcolm, the son of Duncan. Malcolm was proclaimed king.

Maccabees, family consisting of the father, Mattathias, and his five sons, Jochanan, Simon, Judas, Eleazer, and Jonathan, who were the first to make a determined stand against the attempt of Antiochus Epiphanes, the Syrian king, to destroy the Jewish nation. The name Maccabee was originally given to Judas.

Maccabees, Books of, are four in number. The first two are received as canonical by the Roman Catholic Church, and are found also in Luther's translation, as well as, at times, in Protestant Bibles. The first three are regarded as canonical by the Greek Church. None of the books is received as canonical by the Jews.

The First Book of the Maccabees is generally regarded as trustworthy, and is our authority for the history of the Jews from 175 to 135 B.C. The chronology is fixed according to the Seleucid era. It was probably written in Hebrew, by a Jew of Palestine, between the death of John Hyrcanus (106 B.C.) and the

capture of Jerusalem (63 B.C.). It has come down to us in a Greek translation, which was probably known to Josephus. The Second Book of the Maccabees is of a little later date, and is evidently an epitome (2 Macc. ii, 26, 28) of an historical work, in five books, written by Jason of Cyrene. Beginning with the year 175 B.C., it gives the history of the Maccabean uprising, and carries the story down to Judas's victory over the Syrian general Nicanor (160 B.C.). This epitome was known to Philo, but the exact date of its author cannot be determined. It was originally written in Greek. The Third Book of the Maccabees (so called) was probably written in Greek by a Jew of Alexandria. It has nothing to do with the Maccabees, but gives a marvelous and distorted account of the sufferings and deliverance of the faithful Jews of Alexandria during the reign of Ptolemy IV (Philopator), 217 B.C. The Fourth Book of the Maccabees is an ethical treatise written probably during the first century A.D. by an Alexandrian Jew. The author is a strict Jew, with a leaning toward Phariseism. Eusebius and others say that Josephus was the author, and the work is found in most of the MSS. and printed editions of that historian; but there are weighty internal reasons for doubting this. Scholars agree in placing its composition during the first century A.D.

McCarthy, Justin, 1830-1912; Irish political leader and author; b. Cork; journalist in Cork, 1848-52; in Liverpool, 1852-60; editor *London Star*, 1864-68; lived in the U. S., 1868-70, traveling, lecturing, and doing editorial work on the *New York Independent*; leader writer on the *London Daily News* after 1870. He was elected to Parliament, 1880, and became a leader of the Irish Home-Rule party; was reelected from Derry City, 1886, and became vice president of the Irish National League of Great Britain. He was chairman of the Irish Parliamentary party, 1890-96; represented N. Longford in Parliament, 1892-1900; author of "Prohibitory Legislation in the United States," "Modern Leaders," "History of Ireland from the Introduction of Mr. Gladstone's Bill," "History of the Four Georges," "A History of Our Own Times," "Modern England," "The Reign of Queen Anne," and of other works, including novels.

Macchiavelli (măk-kě-ă-vě'ě). See MACHIAVELLI.

McClellan, George Brinton, 1826-85; U. S. military officer; b. Philadelphia, Pa.; son of Dr. George B. McClellan; graduated at West Point, 1846; assigned to the engineers; served in the Mexican War, winning the brevets of first lieutenant and captain for gallantry; was sent to Europe during the Crimean War to report on military systems, and prepared a report on the organization of European armies and the operations during the war. In 1857 he resigned from the army and was successively chief engineer and vice president of the Illinois Central Railway and president of the St. Louis and Cincinnati Railway. At the opening of the Civil War he was commissioned major general of Ohio volunteers, and was placed

in command of the department of the Ohio. He was made major general in the regular army, May 14, 1861, and commanded in W. Virginia. In July he was placed in command of the division of the Potomac, and shortly after of the Army of the Potomac. On the retirement of Gen. Scott, November 1st, he was appointed general in chief of the armies of the U. S. Early in the spring of 1862 he transferred most of the Army of the Potomac to the Peninsula of the James, and laid siege to Yorktown, which was soon abandoned by the Confederates, who, under Gen. J. E. Johnston, made a stand at Williamsburg, May 5th, and fell back to Richmond.

McClellan reached the Chickahominy abt. May 20th, and opened the campaign against Richmond, which was brought to a virtual close by the battle of Malvern Hill, July 1st, after which he fell back to Harrison's Landing, where he intrenched himself. Gen. Halleck, having in the meanwhile been made general in chief, ordered McClellan, August 24th, to return with his whole army to Fortress Monroe and Yorktown. After the defeat of Pope at Bull Run, August 29th, 30th, the command of the forces at and about Washington was conferred on McClellan. The Confederates, under Gen. Lee, then undertook the invasion of Maryland, which was brought to a close by the battle of Antietam, September 16th, 17th. They then crossed the Potomac and fell back toward the Rappahannock. Great dissatisfaction was felt at the slowness with which McClellan followed them, and on November 7th he was superseded in command by Gen. Burnside. McClellan took no further part in the war. In 1864 he was the Democratic candidate for President of the U. S., and received the twenty-one electoral votes of New Jersey, Delaware, and Kentucky. He was engineer in chief of docks and piers in New York, 1870-73, and resigned the office; was Governor of New Jersey, 1878-81. He translated from the French "A Manual of Bayonet Exercises," wrote "The Armies of Europe," etc.; "Report on the Organization and Campaigns of the Army of the Potomac," and "McClellan's Own Story" (of the Civil War).

McClermand, John Alexander, 1812-1900; American military officer; b. Breckinridge Co., Ky.; admitted to the bar of Illinois, 1832; served through the Black Hawk Indian War; member Illinois Legislature, 1837-42; Congress, 1843-51 and 1858-61; resigned to enter Union army as brigadier general of volunteers; commanded at battle of Belmont and the right of the line at Fort Donelson; as major general commanded a division at Shiloh. He relieved Sherman of command of expedition to Vicksburg, 1863; commanded force that captured Arkansas Post, and was in battle of Champion Hills; relieved of command on charges, restored when they were not sustained, and resigned, 1864; was subsequently a circuit judge in Illinois and member of the Utah Commission.

McClintock, Sir Francis Leopold, 1819-1907; British naval officer; b. Dundalk, Ireland; entered the navy, 1831; accompanied Sir James

Ross in his Arctic expedition of 1848; was engaged in Capt. Austin's expedition of 1850 in search of Sir John Franklin, and made a sleigh journey of 760 m. along the N. shore of Perry Sound. He was sent on the expedition of five vessels under Sir Edward Belcher, 1851; rescued Capt. McClure from a three years' imprisonment in the ice near Melville Island, but subsequently had to abandon his own ship and three others. In 1857 took command of the expedition dispatched by Lady Franklin to ascertain the fate of her husband, for which he received many honors; knighted, 1860; rear admiral, 1871; vice admiral, 1877; admiral, 1884.

McCloskey, John, 1810-85; American cardinal; b. Brooklyn, N. Y.; ordained, 1834; made Coadjutor of Diocese of New York, 1844; transferred to the See of Albany, 1847; became Archbishop of New York, 1864; cardinal-priest, 1875. While the first Bishop of Albany he erected a splendid cathedral, founded at Troy a well-equipped theological seminary, built a large number of churches, founded many charitable and religious institutions, and introduced numerous monastic orders and lay communities. While cardinal he labored strenuously to complete St. Patrick's Cathedral in Fifth Avenue, begun by his predecessor.

McClure', Sir Robert John le Mesurier, 1807-73; British naval officer; b. Wexford, Ireland; entered the navy as a midshipman; joined the Arctic expedition under Capt. Back, 1838, as a volunteer; served on the Great Lakes during the Canadian rebellion, 1838-39; took part in Sir John Ross's Arctic expedition, 1848, and took command, 1850, of another expedition, which discovered the Northwest Passage, for which feat he was knighted, received a captaincy, and a reward of £5,000. Rear admiral, 1867; vice admiral on retired list, 1873.

McCook', Alexander McDowell, 1831-1903; U. S. army officer; b. Columbiana Co., Ohio; graduated at West Point, 1852; served against the Indians in New Mexico, 1853-57; instructor of infantry tactics at West Point, 1859-61; commanded First Ohio Volunteers in first Bull Run; brigadier general, U.S.V., 1861, and major general, 1862; commanded division at Shiloh and siege of Corinth, First Army Corps at Perryville, Twentieth Army Corps at Stone River and Chickamauga, and troops defending national capital at time of Early's attack, 1864. After the war he was commandant of Fort Leavenworth Military School; major general, U.S.A., 1894; retired, 1895; represented U. S. Govt. at coronation of Czar, 1896; member of commission to investigate the War Department during the war with Spain, 1898-99.

McCosh', James, 1811-94; Scottish-American educator and philosopher; b. Carskeoch, Ayrshire; while a student at Edinburgh Univ. wrote an essay on the Stoic philosophy, which obtained for him, on motion of Sir William Hamilton, the honorary degree of M.A.; was ordained in the Church of Scotland, 1835; removed to Brechin, 1839; was actively concerned in the disruption of the Scottish Church and in the organization of the Free

Church, 1843; appointed Prof. of Logic and Metaphysics in Queen's College, Belfast, 1851; elected president of the College of New Jersey at Princeton, 1868; resigned, 1888; became president emeritus, retaining his professorship of philosophy until 1890. His principal works include "The Methods of the Divine Government, Physical and Moral"; in connection with Prof. G. Dickie, "Typical Forms and Special Ends in Creation"; "Intuitions of the Mind Inductively Investigated, Being a Defense of Fundamental Truth"; "The Supernatural in Relation to the Natural," "An Examination of Mill's Philosophy," "Logic," "Christianity and Positivism," "The Scottish Philosophy, Biographical, Expository, and Critical, from Hutcheson to Hamilton"; "Psychology," "Realistic Philosophy Defended in a Philosophic Series," "The Religious Aspect of Evolution," "The Tests of Various Kinds of Truth," "Philosophy of Reality."

McCulloch (mä-kül'oh), Ben, 1811-62; American army officer; b. Rutherford Co., Tenn.; early became an expert hunter and boatman; went to Texas to join the expedition of Davy Crockett, but arrived after the death of the latter at the Alamo; served as a private in the battle of San Jacinto, and subsequently in the Mexican War commanded a company of Texan Rangers, and was greatly distinguished at Monterey and Buena Vista, and at the final capture of the City of Mexico; appointed U.S. marshal, 1853, and Commissioner to Utah, 1857. In 1861 he returned to Texas, and, in command of a temporary force of state troops, received the surrender of Twiggs at San Antonio. Appointed brigadier general in the Confederate army, May 14, 1861, he commanded in Missouri at Dug Springs and at Wilson's Creek, and was killed in the battle of Pea Ridge while in command of a division.

McCulloch (mä-kül'oh), John Ramsay, 1789-1864; Scottish economist; b. Whithorn; Prof. of Political Economy in the Univ. of London, 1828-32, and afterwards comptroller of the government stationery office. He published "Principles of Political Economy," "Treatise on the Principles and Practical Influence of Taxation and the Funding System," "Statistical Account of the British Empire," "Dictionary of Commerce and Commercial Navigation," and a gazetteer of the world.

McCullough (mä-kül'oh), John Edward, 1837-85; American actor; b. Coleraine, Ireland; removed to the U. S., 1853; made his first appearance on the stage in Philadelphia, 1855. He traveled and played with Edwin Forrest for several years and received the latter's manuscript plays by bequest, 1873-83; played throughout the U. S. the parts of Brutus, in John Howard Payne's tragedy by that name, *Jack Cade*, the *Gladiator*, *Virginius*, *Damon* and *Pythias*, *Othello*, *Coriolanus*, and *King Lear*.

Macdonald (mäk-dö-näl'), Étienne Jacques Joseph Alexandre (DUC DE TARENTE), 1765-1840; French marshal; b. Sancerre; entered the army, 1784; fought at Jemappes, 1792;

became general of division, 1795. Having been appointed Governor of Rome and the Papal States, 1798, he commanded in the battle at Otricoli; was made general in chief of the army of Naples; was beaten by Suwarow on the Trebbia, June 17, 1799; returned to Paris, and took the side of Napoleon in the Revolution of 18 brumaire; afterwards lost the confidence of the emperor on account of his staunch defense of Gen. Moreau. He received a command, 1809, and distinguished himself so much in the battle of Wagram that he was created Duke of Tarente and made a marshal. In campaigns of 1812-14 he rendered distinguished services, but was defeated by Blücher at Katzbach, August 26, 1813, and adhered firmly to Napoleon till his abdication; lived in retirement during the second Restoration.

Macdonald (măk-dŏn'ăld), *Flora*, 1720-90; Scottish heroine; b. Milton, Island of S. Uist; became celebrated, 1746, as the heroine of some of the remarkable adventures of Prince Charles Edward, the Young Pretender, whom she assisted in escaping pursuit from S. Uist to Skye. She was imprisoned on board vessels of war and in London for several months; released, 1747; married Allan Macdonald, 1750, and settled in Fayetteville, N. C., 1775. During the Revolutionary War her husband served as an officer in the British army, and Flora returned to the Island of Skye, where she died.

MacDonald, George, 1824-1905; Scottish novelist and poet; b. Huntley, Scotland; became an Independent minister, but retired to devote himself to literature, settling in London. He published volumes of poems in 1855, 1857, 1864, 1868, and 1882; his novels include "David Elginbrod," "Alec Forbes of Howglen," "Annals of a Quiet Neighborhood," "Guild Court," "Robert Falconer," "Wilfred Cumbermede," "The Marquis of Lossie," and "What's Mine's Mine."

Macdonald, Sir John Alexander, 1815-91; Canadian statesman; b. Glasgow, Scotland; went with his parents to Kingston, Canada, 1820; admitted to the bar, 1835; elected to the Canadian Parliament for Kingston, 1844; became a member of the Executive Council (or Cabinet), 1847; receiver general, 1847; commissioner of crown lands, 1847-48; attorney-general for Upper Canada, 1854, and several times thereafter; Prime Minister, 1857-58, 1868-73, and 1878-91. He was the inspiring and controlling genius in every ministry in which he held a portfolio; for over forty years was virtually ruler of Canada; was one of the British signers of the Treaty of Washington; and was largely instrumental in bringing about Canadian federation.

McDonough (măk-dŏn'ŏ), *Thomas*, 1783-1825; American naval officer; b. Newcastle Co., Del.; entered the navy, 1800, and served in the frigate *Philadelphia* and the schooner *Enterprise* against Tripoli; commanded a squadron of fourteen vessels on Lake Champlain, and, September 11, 1814, gained a victory over a British squadron of sixteen vessels command-

ed by Capt. George Downie, for which he was made captain, and received a gold medal from Congress. His last command was that of the Mediterranean squadron.

McDou'gall, Alexander, 1731-86; American army officer; b. Island of Islay, Scotland; settled near New York, 1775; became a printer, and was imprisoned by the colonial government, 1770, for an alleged libelous address. He was appointed colonel of the First New York Regiment; brigadier general, 1776, and major general, 1777; was engaged in the battles of Long Island, White Plains, and Germantown, and in the New Jersey campaign; commanded the posts on the Hudson, 1778-80; was Minister of Marine for a short time, 1781; elected a delegate to Congress, 1781 and 1784; to the New York Senate, 1783.

McDow'ell, Edward Alexander, 1861-1908; American composer and pianist; b. New York City; educated at the Paris Conservatory and in Germany. In 1881 he was head of the Darmstadt Conservatory of Music. He returned to the U. S. in 1888, and in 1896 became Prof. of Music at Columbia Univ. His most important works include "Six Idyls after Goethe," "Six Poems after Heine," "Forest Idyls," "Woodland Sketches," "Lancelot and Elaine," etc.

McDowell, Irvin, 1818-85; U. S. army officer; b. Columbus, Ohio; graduated at West Point, 1838; served in the Mexican War; was appointed brigadier general, May 14, 1861; placed in command of the Department of NE. Virginia, and, May 27th, of the Army of the Potomac; commanded at the battle of Bull Run, July 21st; subsequently had charge of the defenses of Washington until March 14, 1862, when he was made major general of volunteers and placed in command of the First Corps of the Army of the Potomac. He took part in the pursuit of Jackson, and under Pope was present at the second battle of Bull Run, August 29, 30, 1862. From July, 1864, to June, 1865, he was in command of the Department of the Pacific; in the latter year was breveted major general, U. S. army. After commanding for some years the departments of the East and the South, he returned to San Francisco, 1874; became full major general, 1872; retired, 1882.

McDuffie, George, abt. 1788-1851; American lawyer; b. Columbia Co., Ga.; admitted to the bar, 1814; was a lawyer, and elected to the S. Carolina Legislature, 1818; became a member of Congress, 1821, where he was a frequent assailant of the protective tariff. In December, 1830, he opened the case for the prosecution in the impeachment trial of Judge Peck. He was one of the most ardent and eloquent champions of the doctrine of nullification, which he regarded not as a constitutional, but as a justifiable revolutionary measure. In 1834 he resigned his seat in Congress; was Governor of S. Carolina, 1834-36; U. S. Senator, 1842-46.

Macé (mă-să'), Jean, 1815-94; French author; b. Paris; best known by his "History of a Mouthful of Bread" and "The Servants of the Stomach," as well as his fairy stories; was professor in various institutions, and, 1866, founded in Paris "The League of Instruction."

Mace, the dried arillus or inner coat investing the shell of the nutmeg, which is the kernel of the nut of *Myristica fragrans*, a tree of the Spice Islands (family *Myristicaceæ*) now naturalized in other hot regions. Mace of inferior quality is also produced by *M. fatua* of the same regions. Mace is used as a spice, and as an aromatic stimulant in medicine. It has also the slight narcotic power of the nutmeg, in a milder degree. It yields a volatile oil upon distillation, and a buttery, fixed oil when subjected to pressure. The oil of mace of commerce is, however, generally the fixed oil of the nutmeg, which is harder than the true oil of mace. Mace, in the fresh state fleshy and of a beautiful crimson, appears in commerce as a mass of flat, dry branching plates of an orange-brown color, and a taste and smell resembling those of nutmeg, but rather milder and pleasanter. See NUTMEG.

Also (1) a weapon consisting of a wooden handle about 5 ft. long with metal head, usually a spiked ball, sometimes of other forms; was much used by knights in the days of plate armor, against which it was particularly effective, as a strong blow would frequently drive a spike through the plates; was also used as a weapon by priests, who were forbidden to carry a sword. Ornamental maces, sometimes of copper or silver, are now used as badges of authority by magistrates and in legislative assemblies. (2) A substitute for the cue in billiards. (3) A currier's mallet used in dressing leather.

Macedo (mă-să'dô), Joaquim Manoel de, 1820-82; Brazilian author; b. Itaborahy; became Prof. of Brazilian History in Dom Pedro College, Rio de Janeiro; wrote novels, dramas, and comedies; was one of the chief forces in the literary and scientific life of Brazil in the nineteenth century; most important work the lyric poem "A Nebulosa," in which felicitous descriptions of the tropical nature of Brazil abound.

Macedonia, or **Mac'edon** (the latter name being used by English writers to designate the state or empire, the former the land or province), ancient country of SE. Europe, N. of Greece, the principal parts of which formed the Turkish vilayet of Selanik (Salonica). Its most ancient name among the Greeks seems to have been Emathia, and subsequently Macetia or Maxetia, the people being called Macetæ. The name Macedonians is first applied to them by Herodotus. The boundaries of Macedonia varied at different periods. In the time of Herodotus it consisted only of the district extending from the confines of Thessaly to the river Lydias. The Kingdom of Philip, father of Alexander the Great, was bounded N. by the Scardus, Scamius, and Orbelus ranges, E. by the Rhodope range and Nestus River

(now Kara-su), SE. by the Ægean Sea, S. by the Olympus and the Cambunian Mountains, and W. by the N. prolongation of the Pindus and the river Drilo (Drin). Under the Romans the province of Macedonia included large portions of the neighboring W. and S. countries. Macedonia, having been founded by Perdiccas I, first appeared in history under Amyntas, abt. 500 B.C. It was made the virtual mistress of Greece by Philip, 359-36, son of Amyntas II, and the greatest empire of the period by the conquests of his son Alexander, 336-23. It was broken by the victories of the Romans at Cynoscephalæ, over Philip V, 197, and at Pydna, over Perseus, 168, and made a Roman province after the final defeat of the Achæans, 146.

Conditions in Macedonia in 1912, because of Turkish misrule, served as a principal cause of the first Balkan war and after the second Balkan War the greater part of the territory was awarded to Greece and Serbia. In 1915 the Germans occupied the Servian allotment, and the Allies entered the Greek portion in the fortification of Salonica. There was fighting in both sections in 1916-17, the chief result being the recapture of Monastir from the Bulgarians.

Macerata (mă-chă-ră'tă), town in province of Macerata, Italy; about 30 m. NW. of Fermo; is surrounded by strong walls crowned by thirty-three towers, and at one of its six gates stands a triumphal arch. Among the public buildings are the cathedral, containing old mosaics and pictures of interest; the churches of Santa Maria delle Vergini, of much architectural merit, and that of Santa Maria della Pace, of the fourteenth century, and a palace of the thirteenth century, which is one of the finest specimens existing of the architecture of that age. There is a university founded, 1824, by Pope Leo XII. Macerata was built abt. 408 A.D. on the ruins of Ricina, a celebrated town of the territory of Piceno. Pop. (1907) 22,784.

Macfarren, Sir George Alexander, 1813-87; English composer; b. London; succeeded Sir William S. Bennett as Prof. of Music at Cambridge Univ., and a principal of the Royal Academy of Music, 1875; chief works in opera, "Don Quixote," "The Devil's Opera," "Robin Hood," "She Stoops to Conquer," "Charles II." and "The Prince of Modena," in oratorio, "St. John the Baptist," "Joseph," "The Resurrection," "King David"; in cantatas, "The Sleeper Awakened," "Leonard," "Christmas," "The Lady of the Lake," "Outward Bound," and music to Sophocles's "Ajax"; also composed five symphonies, several overtures, much church music, many songs and smaller works.

McGee, Thomas d'Arcy, 1825-68; Canadian journalist; b. Carlingford, Ireland; became chief editor of the *Pilot*, Boston, Mass.; London correspondent of the *Freeman's Journal*, Dublin; secretary of the Irish Confederation, and an editor of *The Nation*. He fled to New York, 1848; afterwards settled in Montreal, where he became an ardent royalist; entered

Parliament, 1857; chosen president of the Executive Council, 1864; made Minister of Agriculture, 1867; denounced Fenianism; and was assassinated at Ottawa; chief works include "O'Connell and his Friends," "Canadian Ballads," "Irish Settlers in America," "Protestant Reformation in Ireland," "History of Ireland," "Catholic History of North America," "Speeches and Addresses on the British American Union."

McGiffin, Philo Norton, 1860-98; American-Chinese naval officer; b. Washington Co., Pa.; graduated at Annapolis, 1882, and honorably discharged because of reduction of the navy. He went to China, 1883; was appointed a professor in the naval college at Tientsin; transferred to the new naval college at Wei-hai-wei, 1887; appointed to command the ironclad *Chen-Yuen* at beginning of war with Japan, 1894; was the hero of the terrible fight on the Yalu River, September 17th, following, the first engagement between modern warships; was wounded, blinded, and deafened by the premature discharge of a gun, but saved his ship, the only Chinese vessel that came out of the fight with credit, although she had been struck 400 times. Refusing to commit suicide, according to custom, for having suffered defeat, he went to New York, and in a moment of physical agony, because of his many wounds, killed himself in a hospital.

McGill, James, 1744-1813; Canadian philanthropist; b. Glasgow, Scotland; removed to Canada abt. 1770; for some time after arrival was engaged in the NW. fur trade; subsequently became a merchant in Montreal. He was for many years a member of the Lower Canada Parliament, and afterwards of the Legislative and Executive councils; was mainly instrumental in founding the college (now university) in Montreal which is named after him.

McGill University, educational institution in Montreal, Canada; founded, 1811, by James McGill, and subsequently enriched by many generous friends. Lord Strathcona and Mount Royal erected and endowed the Royal Victoria College for Women; Sir William C. Macdonald erected and endowed the Macdonald Engineering Building, Macdonald Chemistry and Mining Building, and the Macdonald Physics Building, and endowed the Law Faculty; and Peter Redpath gave the Redpath Museum and the University Library. The faculties are arts, applied science, law, medicine, and dentistry. Students in attendance 1910-1 numbered 2,012. There are four theological seminaries housed near the university grounds. The institution is nonsectarian.

McGlynn, Edward, 1837-1900; American clergyman; b. New York City; educated at the College of the Propaganda in Rome; became pastor of St. Stephen's Church in New York City, where he rapidly gained great influence over his congregation, 1866. His opposition to the establishment of parochial schools and his championship of the doctrines of Henry George brought him into disfavor, and he was sum-

moned to the Vatican. On refusing to obey he was excommunicated. In 1887 he aided in founding the Antipoverty Society, and became its president. A reconciliation was effected between him and the Church, 1893, and he was restored to his rank and dignity.

McGready (măk-gră'di), James, abt. 1758-1817; American clergyman; b. W. Pennsylvania; became a Presbyterian minister in N. Carolina; removed to SW. Kentucky, 1796, where he directed a remarkable revival of religion, which, begun, 1797, lasted for some years, and led to the organization, 1800, of the first camp meeting. The movement thus begun was carried on by young men who were ordained to the ministry without a regular education in theology. This step gave rise to opposition, and the ecclesiastical difficulties culminated, 1810, in the organization of a new Church, which took the name Cumberland Presbyterian Church from the region of its origin.

MacGregor, John, 1825-92; English traveler; b. Gravesend; made a tour of Europe, the Levant, Egypt, and Palestine, 1849-50; was called to the bar, 1851; visited Russia and every country in Europe, as well as Algeria, Tunis, the U. S., and Canada. In 1865 he made a canoe voyage, and in the following year published his log book, under the title "A Thousand Miles in the *Rob Roy* Canoe on Rivers and Lakes of Europe"; other works, "The *Rob Roy* on the Baltic" and "The *Rob Roy* on the Jordan," all of which were very popular.

Machaon, in Greek mythology, a son of Asclepius and Epione, and himself a skillful physician. Along with his brother Podalirius he conducted thirty Thessalian ships to Troy, where they acted as the physicians of the Greeks. He was wounded by Paris, but was saved from death by Nestor. He was one of the heroes in the wooden horse.

Machiavelli (măk-ă-vêl'le), Niccolò di Bernardo, 1469-1527; Florentine statesman; son of a lawyer who traced his ancestry to Hugo, Marquis of Tuscany; was secretary to the Ten of Liberty and Peace, a body of magistrates to whom was intrusted the supreme government, 1498-1512; had charge of all the political correspondence; was employed in twenty-three foreign embassies, including four to the Court of France and two to the Emperor Maximilian; lost his office on the return of the Medici from their long exile; and on a charge of conspiracy against Cardinal de' Medici was imprisoned and tortured, but refused any confession. Soon after the accession of the cardinal to the papacy as Leo X, the pope included him in an amnesty, and admiring his literary merit, began gradually to recall him to public life, and finally gave him several missions of importance. In Pope Clement VII he also found a firm friend, and was afterwards employed in many negotiations. Of the writings of Machiavelli, the most celebrated is the treatise commonly called "The Prince," written abt. 1514 and printed, 1532. This work was formerly

almost universally condemned as designed to teach the vilest arts of despotism; but the researches of modern Italian scholars, and a better consideration of the political state of Italy in that age, have vindicated in some measure the name of its author from the opprobrium heaped upon it. The work is a calm and forcible exposition of the means by which tyranny may be established and sustained.

Machine' and Rap'id-fire Guns, class of ordnance that has come into general use within very recent years. A machine gun is one that is loaded and fired by machinery. A rapid-fire gun is distinguished from a machine gun by the fact that it is loaded by hand, and may be fired either by hand or by machinery; it is generally of larger caliber, and has but one barrel, while the machine gun may have more. In both classes there is practically no recoil. The fire of the machine gun is more rapid than that of the rapid-fire gun, but the latter delivers a comparatively rapid, well-aimed fire of large, armor-piercing projectiles, with relatively small weight of gun, while the former is generally limited in caliber to the small-arm ammunition; or, if it goes beyond this, as with the Hotchkiss revolving cannon, the weight of the gun becomes very great for the caliber. For these reasons machine guns are restricted to infantry fighting, and cannot cope with artillery. At present machine guns are preferably used on land for defensive purposes in fixed positions, such as the defense of ditches or defiles, and on shipboard they are mounted in the tops, and are intended to sweep the decks of the adversary. Rapid-fire guns are almost exclusively used in the navy against torpedo boats. By their power they are enabled to penetrate any armor that torpedo boats can carry, and by their rapidity and accuracy the chances of hitting in a given time are greatly increased.

The machine guns embrace the Mitrailleuse, of France, the best known of the early weapons of this character, which had twenty-five barrels, grouped in parallel rows of five; the Gatling, of the U. S., consisting of a group of barrels around a central shaft; the Gardner, with two parallel barrels, side by side; the Nordenfellt, composed of from two to seven parallel barrels; the Hotchkiss, in which the barrels are made to revolve; and the Maxim, of the U. S., an automatic gun of a single barrel. Of the rapid-fire guns, the best known are the Hotchkiss, of various calibers, from the 1-pounder (1.46 in.) to the 100-pounder (6.10 in.); the Driggs-Schroeder, in which the breech block has a combined sliding and rotating movement; the Nordenfellt, in which the object of the Driggs-Schroeder is secured by different means; and the Maxim, which differs from the other guns of its class by being semiautomatic—that is, after the first fire all the operations are performed by the gun itself, except that it is necessary to introduce the cartridge by hand. Other guns of this character are the Albini, Armstrong, Canet, Gruson, and Krupp; but the foregoing are types. Detailed descriptions of the two forms in this class of ordnance the reader will find in the "re-

ports" of the chiefs of ordnance of the army and navy. See ARTILLERY; GUNNERY; MAGAZINE GUNS.

McIntosh, John, 1755–1826; American soldier; b. McIntosh Co., Ga.; nephew of Lachlan McIntosh; was an officer of the Georgia line, 1775, and as lieutenant colonel defended the fort at Sunbury when it was besieged by the British. At the battle of Brier Creek, March 3, 1779, he displayed great bravery, but was forced to surrender. At the close of the war he settled in Florida, was seized and imprisoned nearly a year at Havana, and then returned to Georgia. In the last months of the War of 1812 he served at Mobile.

McIntosh, Lachlan, 1725–1806; American soldier; b. near Raits, Scotland; became brigadier general of Georgia troops, and accepted a command in the central army under Washington, who selected him to conduct a campaign against the Indians in the West, 1778. In 1779 he took command of the Georgia troops at Augusta, and bore an active part in the siege of Savannah. After the repulse there he retreated to Charleston, and became a prisoner of war. He was a member of Congress, 1784.

Mackay (mă-kt'), Charles, 1814–89; Scottish author; b. Perth; 1834–44 was on the staff of the London *Morning Chronicle*; 1844–47, editor of the Glasgow *Argus*; 1860, established the London *Review*; 1862–65, was the American correspondent of the London *Times*. He published "Memoirs of Extraordinary Popular Delusions," "The Scenery and Poetry of the English Lakes," "A Man's Heart," "Studies from the Antique, and Sketches from Nature," "Lost Beauties and Perishing Graces of the English Language," and several volumes of poems.

Mackean (mă-kēn'), Thomas, 1734–1817; signer of the Declaration of Independence; b. Londonderry, Pa.; 1765, attended the General Congress of the Colonies at New York, and was appointed Common Pleas Judge for New Castle Co., Del.; was a member of Congress from Delaware, 1774–83, and its president, 1781. In 1777 he was appointed Chief Justice of Pennsylvania, and officiated as President of the State of Delaware, for which he drew up a constitution; was Governor of Pennsylvania, 1799–1808.

McKees'port, city in Allegheny Co., Pa.; on the Monongahela River at the mouth of the Youghiogheny, both here navigable for steamboats; 14 m. SE. of Pittsburgh. It is the center of the greatest bituminous-coal region in the country and of the natural-gas wells; has the largest wrought-iron pipe works in the world, and manufactures of sawed lumber, locomotives, railroad cars, and glass; number of "factory-system" manufacturing establishments, 1909, 68, employing 8,246 hands; value of output, \$42,495,000. Pop. (1910) 42,694.

Mackenzie, Sir Alexander, d. 1820; Scottish explorer; b. Inverness; removed to Canada when young; entered the service of the Northwest Fur Company; passed eight years at

Fort Chippewyan on Lake Athabasca, where he formed a project of an exploring expedition to the N. Ocean; spent a year in England in the study of astronomy and navigation; set out from Fort Chippewyan, June 3, 1789, with four canoes and a party of twelve persons; discovered and explored to lat. 69° the great river to which he gave his name; and in a second expedition from Fort Chippewyan, begun October, 1792, reached the Pacific Ocean at Fort Menzies, July, 1793; first European to cross from sea to sea through Canada; knighted, 1802.

Mackenzie, Alexander, 1822-92; Canadian statesman; b. near Dunkeld, Scotland; removed to Canada, 1842; became a contractor and builder; represented E. York in the Canada Assembly, 1861-67; the same in the Dominion Parliament, 1867-92; sat for W. Middlesex in the Ontario Assembly, 1871-72, and was Treasurer of the province during that period. He declined a seat in the Canadian Cabinet, 1865; led the Ontario opposition in the Dominion Parliament, 1867-73, when he was elected leader of the entire reform opposition of Canada. On the resignation of Sir John Macdonald, Mr. Mackenzie was called on to form a new administration, which he did, November 7, 1873, taking the offices of Premier and Minister of Public Works, which he held till he and his Cabinet resigned, 1878, in consequence of the Conservatives being returned to power.

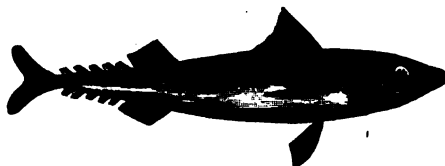
Mackenzie, Alexander Slidell, 1803-48; American naval officer; b. New York; name was originally Slidell; that of Mackenzie was added, 1837; served in the Mediterranean, the W. Indies, the Brazilian waters, and the Pacific. In 1842 he commanded the brig *Somers*, and on his passage from the coast of Africa the existence of a mutinous plot on board was discovered, the principals of which, including a son of John C. Spencer, then Secretary of War, were executed at sea. After his arrival in New York, Mackenzie was tried by court martial and acquitted. He was ordnance officer at the siege of Vera Cruz, and commanded a division of artillery on the storming of Tabasco, 1847. He published "A Year in Spain," "Popular Essays on Naval Subjects," "The American in England," "Spain Revisited," and lives of John Paul Jones, Perry, and Decatur.

Mackenzie, Sir Morell, 1837-92; English laryngologist; b. Leytonstone, Essex; became expert in the use of the laryngoscope in Budapest; introduced the instrument in his practice in London; held various appointments in the London Hospital, 1860-74; founded a hospital for sole treatment of diseases of the throat in London; treated Crown Prince Frederick, subsequently Frederick III of Germany, in his last illness; knighted, 1887; first president of the British Laryngological Society; chief works, "Essay on Growths in the Larynx," "Manual of Diseases of the Throat and Nose," and "The Hygiene of the Vocal Organs."

Mackenzie River, one of the largest streams on the globe; rises in Great Slave Lake, in Canada, and flows in a NNW. direction to the frozen ocean; is navigable in the open season from its mouth to Fort Simpson, where

there are rapids; above which it is again navigable to Great Slave Lake. Its three great head streams are the Peace, Athabasca, and Liard rivers; extreme length, 2,300 m.; area of drainage, 590,000 sq. m. Lignite beds occur on its banks, and a large part of its upper basin is fertile and habitable land.

Mack'erele, name of various salt-water fishes of the genus *Scomber* (family *Scombridae*). The most important species is the common mackerel, *Scomber scombrus*, found in the N. Atlantic, and caught on the shores of both con-



COMMON MACKEREL.

tinents in immense numbers, both by hooks and nets. As a fresh fish, the mackerel is of rich and excellent flavor; it is also salted in great quantities. It attains a weight of 3 lbs. Gloucester and Yarmouth, Mass., are the great centers of the mackerel fishery in the U. S.

Mackinac (māk'i-nā), village in Mackinac Co., Mich.; on Mackinac Island, Lake Huron, NE. of Mackinac Strait. The island, which is 3 m. long by 2 m. wide, was a place of much importance in the colonial period. It was settled by the French; made a missionary station, 1669; captured and its inhabitants massacred by Pontiac, 1763; and captured by the British, 1812. The island is a popular summer resort, has a good harbor, and has large exports of fish.

McKin'ley, William, 1843-1901; twenty-fifth President of the U. S.; b. Niles, Ohio; son of William McKinley, iron manufacturer; great-grandson of David McKinley and Andrew Rose, Revolutionary soldiers; entered Allegheny College, 1860, but, owing to ill health, did not remain long, and became a school teacher. When the Civil War broke out, 1861, he was a clerk in the Poland (Ohio) post office, and was one of the first to enlist (in Company E, Twenty-third Ohio Infantry); took part in engagements in West Virginia; was promoted commissary sergeant abt. 1862; with the regiment joined McClellan's forces in Maryland; for his efficient services as commissary at Antietam was promoted to second lieutenant, September, 1862, and to first lieutenant, February, 1863. For distinguished bravery and gallantry at Kernstown, near Winchester, Va., where he saved the Thirteenth West Virginia Regiment from capture, July 24, 1864, he was promoted to captain, and at Opequan, Cedar Creek, and Fisher's Hill he again distinguished himself.

In February, 1865, he received from Pres. Lincoln a commission as major by brevet, at that time being acting assistant adjutant general on the staff of Gen. Samuel S. Carroll, commanding the Veteran Reserve Corps at Washington. Mustered out, July 26, 1865, he returned to Poland, Ohio; there studied law;

was admitted to the bar at Warren, 1867, and settled at Canton, Ohio, where he married Ida Saxton. In 1869-71 he was prosecuting attorney for Stark Co. Speeches in favor of honest money and the resumption of specie payments brought him into greater prominence, and, 1876, he was elected as a Republican to Congress, where he served until defeated for reelection, 1891. Here he distinguished himself as a statistician, a defender of the doctrine of protection, an advocate of arbitration as the best means of settling labor disputes, and a worker for the passage of the Dependent Pension bill over President Cleveland's veto. As chairman of the Ways and Means Committee, he reported the tariff law of 1890 (in the preparation of which he took a leading part), which has always been known by his name.

In 1891 he was elected Governor of Ohio by a plurality of 21,511 over James E. Campbell, the Democratic incumbent, and, 1893, was re-elected. He was a delegate-at-large in the Republican National conventions of 1884, 1888, 1892, and on the last occasion received 182 votes for the Presidential nomination, though he had refused to allow his name to be used. At the National Convention, 1896, he was made the Presidential candidate of his party, receiving 661½ votes, his nearest competitor being Thomas B. Reed. In November he received 7,104,779 popular votes to William J. Bryan's 6,502,925, and in the electoral college 271 to 176 for Bryan.

The chief events of his first term were the revision of the tariff, 1897; the war with Spain, 1898, and the acquisition of Porto Rico and the Philippines; and the annexation of the Hawaiian Islands, 1898. In 1900 he was re-nominated, Theodore Roosevelt being placed on the ticket for Vice President. His principal opponent, as before, was Bryan. McKinley received a majority of 443,054 popular votes and a plurality over Bryan of 832,280. At the Pan-American Exposition, held in Buffalo, 1901, September 5th was set apart as President's Day, and the Chief Executive delivered a notable address on that occasion. A public reception was held in the Temple of Music the next afternoon, and at that time the President was shot twice by an Anarchist, Leon F. Czolgosz. He died September 14th. His remains, after lying in state in the Capitol at Washington, were interred, September 18th, at Canton, where a magnificent mausoleum was erected, 1907. The assassin was executed October 29th.

McKinley, Mount, highest mountain peak on the N. American continent; altitude, 20,464 ft. It is about 125 m. N. of Cook Inlet, Alaska; about lat. 63° 4' N. and long. 151° W., and forms the W. extremity of the Alaskan range.

Mackintosh, Sir James, 1765-1832; Scottish author; b. Aldourie; settled in London; published "Vindiciae Gallicae," a defense of the French Revolution against the strictures of Burke's "Reflections," 1791; called to the bar at Lincoln's Inn, 1795; knighted, 1803; Recorder of Bombay, 1804-6; Judge of Admiralty, 1806-11. He entered Parliament, 1813, and was Prof. of Law and General Politics at Haileybury College, 1818-24, still taking an

important place in Parliamentary business. Among his more important works are a "Brief History of England," "Dissertation on the Progress of Ethical Philosophy," "Life of Sir Thomas More," and a posthumously published "History of the Revolution in England in 1688."

Macklin, Charles, abt. 1690-1797; Irish actor; b. Westmeath; real name McLaughlin; in 1711 visited England; joined a strolling company of players, 1771; and made his appearance in London as *Alexander* in "Oedipus," 1725. In 1741 he established his fame by his representation of *Shylock* at Drury Lane Theater. He retired from the stage, 1753, but returned to it, 1758, and continued to appear with some intervals till near his one hundredth year (1789). He was the author of ten dramas, the best known of which are "The Man of the World" and "Love à la Mode."

McLane, Robert Milligan, 1815-98; American diplomatist; b. Wilmington, Del.; son of the preceding; graduated at West Point, 1837; served in the Florida Seminole War, in the Cherokee country, and in the Northwest; resigned and was admitted to the bar, 1843; member Maryland Legislature, 1845-47; of Congress, 1847-51; Commissioner to China, 1853-55; Minister to Mexico, 1859-61; member of Congress, 1879-83; Governor of Maryland, 1884-85; Minister to France, 1885-89.

MacLaren, Ian. See WATSON, JOHN.

McLean (mak-lan'), John, 1785-1861; American jurist; b. Morris Co., N. J.; admitted to the bar, 1807; began practice at Lebanon, Ohio; member of Congress, 1813-16; Judge of the Supreme Court of Ohio, 1816-22; appointed Commissioner of the General Land Office, 1822; Postmaster General, 1823-29, when he was appointed Associate Justice of the U. S. Supreme Court. In the Dred Scott case (1857) he dissented from the decision of the court as given by Chief Justice Taney, and held that slavery had its origin merely in power, and was against right. In the National Republican conventions of 1856 and 1860 he was strongly supported for the Presidential nomination. He was the author of several volumes of "Reports of the United States Circuit Court."

Maclean, Kaid, Gen. Sir Harry Aubrey, abt. 1848- ; British military officer; b. Scotland; son of Maj. Andrew Maclean, of the army medical service; as an officer of the Sixty-ninth Foot served in the Red River expedition in Canada under Lord Wolseley; accompanied his regiment to Gibraltar; resigned to become colonel of the Sultan of Morocco's bodyguard and practically a Cabinet officer; knighted, 1901, for services to the British Govt. In July, 1907, he journeyed to Rouina to meet Raisuli, a notorious bandit chief, formerly Governor of Tangier, whom the Sultan was endeavoring to bring to terms. On his arrival he was made prisoner and carried away as a hostage, his restoration being conditioned on the payment of a heavy indemnity and the reinstatement of Raisuli as Governor of Tangier and of Fohs and his appointment to the command of the police.

Macleod, Fiona. See SHARP, WILLIAM.

MacLeod', Norman, 1812-72; Scottish clergyman and editor; b. Campbeltown; became minister of the National Kirk; parish minister of Loudoun, 1838-43; of Dalkeith, 1843-51; in Glasgow (Barony parish), 1851. He was a founder of the Evangelical Alliance, 1847; took a leading part in the advocacy of foreign missions; became chaplain to the queen for Scotland, 1857; edited *The Christian Magazine* (Edinburgh, 1850-60), *Good Words* (1860-72); was author of "The Earnest Student" (a biography of John Mackintosh), "Parish Papers," "Eastward," and "Peeps at the Far East."

MacIise (māk-lëss'), Daniel, 1806-70; British painter; b. Cork, Ireland; went to London, 1828; won several prize medals while a student in the Royal Academy; elected Academician, 1840; most important works were huge frescoes and water-glass paintings in the Houses of Parliament; other works: "The Death of Nelson" and "The Meeting of Wellington and Blücher after Waterloo," both in the Victoria Gallery; "Alfred in the Danish Camp," "The Choice of Hercules," "Henry VIII and Anne Boleyn," "Charles I and Cromwell," "The Sleeping Beauty," and "Shakespeare's Seven Ages."

MacIure', William, 1763-1840; American geologist; b. Ayr, Scotland; removed to the U. S., 1796; conceived a plan for making a geological survey of the country, and for that purpose crossed the Alleghanies fifty times and visited nearly every state in the Union. His memoir presented to the American Philosophical Society, 1817, was accompanied by the first geological map of the U. S., and he thereby gained the title of "father of American geology." He was president of the Philadelphia Academy of Natural Sciences from 1817 till death.

MacMahon (māk-mā-ōā'), Marie Edme Patrice Maurice (Comte de and Duc de Magenta), 1808-93; French marshal and statesman; b. Château de Sully, near Autun; son of the Marquis Charles Laure de MacMahon, whose Irish ancestors had settled in France after the downfall of the Stuarts. He entered the army, 1827; served in Algeria and at the sieges of Antwerp and Constantine; and became general of division, 1852. In the Crimean War the capture of the Malakhoff, September, 1855, was mainly due to his energy. In 1857 he coöperated with Gen. Randon in the successful Kabyle expedition, after which he commanded the Algerian land and naval forces. In the Italian campaign of 1859 he commanded the Second Corps, and on June 4th decided the brilliant victory at Magenta, and was made duke and marshal. He was Governor General of Algeria, 1864-70.

In July, 1870, he was posted near Strassburg, in command of the First Corps. The defeat of his advance guard under Gen. Abel Douay, near Weissenburg, August 4th, was the first French reverse in the Franco-German War. MacMahon advanced to Wörth, and was utterly routed by the Prussian Crown Prince, August 6th. He retreated to Châlons, where

he was joined by the emperor. Having collected about 100,000 men, he was ordered by Palikao to coöperate with Bazaine at Metz. He had not advanced far when one of his most important corps under Failly was defeated at Beaumont, August 30th, and compelled to retreat toward Sedan, where MacMahon consequently massed his forces. The Germans opened the battle there at dawn, September 1st, and MacMahon was soon disabled and resigned his command. He was detained as a prisoner in Germany till the preliminary peace of February, 1871. Early in April he became commander in chief against the commune of Paris. After his final victory over the latter, May 28th, he was relieved, July 1st, by Ladmirault as commander of Paris. On the retirement of Thiers, May 24, 1873, the presidency was offered to him, and, November 19th, his term was prolonged to seven years, but he resigned, January 30, 1879. He published a work on the army of Versailles, and wrote his military memoirs (published posthumously).

McMas'ter, John Bach, 1852- ; American historian; b. Brooklyn, N. Y.; instructor in civil engineering at Princeton College, 1877-83; became Prof. of American History, Univ. of Pennsylvania, 1883; author of "The People of the United States," "Benjamin Franklin as a Man of Letters," "With the Fathers: Studies in American History," "Origin, Meaning, and Application of the Monroe Doctrine," "History of the United States," "Daniel Webster," "The Struggle for the Social, Political and Industrial Rights of Man," etc.

MacMon'nie, Frederick William, 1863- ; American sculptor; b. Brooklyn, N. Y.; completed his art education in Europe and opened a studio in Paris; exhibited his first figure, "Diana," in the Salon of 1889, and the statues of Nathan Hale (now in City Hall Park, New York) and of James S. T. Stranahan (now in Brooklyn, N. Y.) in that of 1891; decoration of Legion of Honor, 1896; grand prize of honor, Paris Exposition, 1900. Among other works are the quadriga on the Memorial Arch in Prospect Park Plaza, Brooklyn, N. Y.; figure of Victory on Battle Monument, West Point; "Bacchante," in Luxembourg Museum, Paris, and Metropolitan Museum, New York; statue of Sir Harry Vane, Boston Public Library; statue of Shakespeare and bronze doors, Library of Congress, Washington; fountain, World's Columbian Exposition, Chicago; equestrian statue of Gen. George B. McClellan, Washington. He has exhibited, also, portraits in oil.

McMur'rogh, Dermot, King of Leinster, Ireland, 1140-68, when he was expelled by his subjects; applied unsuccessfully for aid to Henry II of England; obtained the services of Richard de Clare, Earl of Pembroke (surnamed Strongbow), by whom he was restored to power, 1170. Dermot gave Strongbow his daughter Eva in marriage, and, dying in the same year, was succeeded by the invader as a vassal to the English king, this being the foundation of the English claim of supremacy in Ireland.

McNab', Sir Alan Napier, 1798-1862; Canadian military officer and statesman; b. Niagara; became a midshipman, 1813; served in the naval expedition against Sackett's Harbor and other U. S. ports of Lake Ontario; joined the army as an ensign; was present at the capture of Fort Niagara and at the battle of Plattsburg; practiced law at Hamilton; was elected a member of the Assembly of Upper Canada, 1830; later became its Speaker; commanded the Canadian militia on the Niagara frontier during the insurrection of 1837-38; routed the insurgents near Toronto, December 7, 1837. He was knighted in 1838, and was Prime Minister, 1854-56. During his administration the Reciprocity Treaty with the U. S. was signed, and the Clergy Reserves and Seigniorial Tenure difficulties brought to an end. He became a baronet, 1857.

Macomb (mä-kôm'), Alexander, 1782-1841; American military officer; b. Detroit, Mich.; at the time of the declaration of war with Great Britain (June, 1812) was acting adjutant general of the army; was appointed in July colonel of the Third Artillery, and distinguished himself at Fort Niagara and Fort George; promoted to brigadier general, 1814. On September 11, 1814, he fought the battle of Plattsburg, defeating a largely superior force under Sir George Prevost, for which service he received the thanks of Congress and a gold medal; was also breveted major general and commanded a military department in the Northwest, 1815-21. On the reorganization of the army he was retained as chief engineer, with rank of colonel. In May, 1828, he became major general in command of the army.

Ma'con, Nathaniel, 1757-1837; American statesman; b. Warren Co., N. C.; served in the army, 1778-80; State Senator, 1780-85; member of Congress, 1791-1815; Speaker, 1801-6; U. S. Senator, 1816-28; President pro tem., 1825-27; received all the electoral votes of Virginia for the Presidency, 1824; in Congress voted for the embargo and for the declaration of war against Great Britain; also voted against all schemes of internal improvement.

Macon, capital of Bibb Co., Ga.; on both sides of the Ocmulgee River, at the head of navigation; 80 m. SE. of Atlanta; is in an agricultural and fruit-growing region, with granite hills, hardwood forests, and brick-clay deposits in the vicinity. The city has a public park of 237 acres, in which the State Agricultural Society has its buildings and holds its fairs. It is the seat of the State Academy for the Blind, Mercer University (Baptist), St. Stanislaus College (Roman Catholic), Wesleyan Female College, Mount de Sales Academy (Roman Catholic), Ballard Normal School (colored), and the Gresham High School; and has a U. S. Govt. building, curious Indian mounds, public library, and hospital. The principal industry is the manufacture of cotton fabrics, and there are also brass and iron foundries, lumber and planing mills, and agricultural implement works. The city is the center of the cotton belt, and has a large wholesale trade. Pop. (1910) 40,665.

Macpherson, Sir David Lewis, 1818-96; Canadian statesman; b. Inverness, Scotland; removed to Canada, 1835; was a member of a firm of constructors of several Canadian railways and other important works; president of the Intercolonial Railway Company, and arbitrator for the Province of Ontario under the British N. American Act. He represented Sauguen District in Legislative Council of Canada, 1864-67; was called to the Senate, 1867; Speaker of that body and member of Cabinet without portfolio, 1880-83; Minister of the Interior, 1883-85; knighted, 1884.

Macpherson, James, 1738-96; Scottish author; b. Ruthven, Invernesshire; completed his education at the Univ. of Edinburgh, where, 1768, he published "The Highlander," a poem in six cantos. His "Fragments of Ancient Poetry Collected in the Highlands of Scotland," 1760, a small volume, purporting to be a translation of ancient Celtic poetry, was received with universal enthusiasm, and a subscription was raised to enable the author to secure such remaining specimens of Celtic poetry as might yet be recovered. Macpherson accordingly made an extensive tour through the mainland and islands inhabited by the Gaelic race, and published, 1762, "Fingal, an Ancient Epic Poem in Six Books; Together with Several Other Poems Composed by Ossian, the Son of Fingal, Translated from the Gaelic," and, 1763, "Temora, in Eight Books, with Other Poems by Ossian."

The reception of the first of these works was extremely flattering, but with the publication of "Temora" a party sprang up which did not hesitate to question the authenticity of the alleged translations. The controversy raged bitterly for fifty years, and to this day there are believers in the genuineness of Ossian. The general verdict is against Macpherson's claim, and it is noteworthy that during the liveliest part of the battle he refused, as he continued to do, proof of the authenticity of his "translations." In 1766, after spending two years in America, he settled in London. In 1771 he published "An Introduction to the History of Great Britain," which was attacked with severity. His prose translation of the "Iliad," 1773, was condemned as beneath criticism. He wrote a "History of Great Britain from the Restoration to the Accession of the House of Hanover," and other works, in the Tory interest; and in reward for his services was appointed agent to the Nabob of Arcot, and elected to Parliament, holding the seat for upward of ten years. At his own request he was buried in Westminster Abbey. See FUGAL; FIONA.

McPherson, James Birdseye, 1828-64; U. S. military engineer; b. Sandusky Co., Ohio; graduated at West Point and assigned to the Engineer Corps, 1853; in early part of the Civil War was assistant engineer of the Department of the Missouri and chief engineer on Grant's staff; promoted to major general of volunteers, 1862, and brigadier general, U. S. army, 1863; had brilliant career from the capture of Fort Henry to the surrender of Vicksburg; was second in command in Sherman's raid to

Meridan; appointed commander of Army of the Tennessee, 1864; commanded the left grand division in the battles before Atlanta; and was killed in action.

Macready (măk-rē'dī), **William Charles**, 1793-1873; English actor; b. London; made his first appearance at Birmingham in "Romeo" when seventeen years old; first undertook *Hamlet*, 1811; played with Mrs. Siddons at Newcastle in "The Gamester" and "Douglas"; was seen in London at Covent Garden as *Orestes*, 1816. In 1822 his engagement began at Covent Garden, and his reputation rose in parts like *Virginius* and *Mirandola* till 1826, when he went to Drury Lane. The same year he visited the U. S.; the next year he made a Continental tour; 1828, played in Paris; returned to England, and for several years played in London and all the chief cities of the kingdom; revisited the U. S., 1843-44; made another engagement in Paris and performed in "Hamlet" at the Tuileries before Louis Philippe; returned to the U. S. again, 1849, during which year the Astor Place riot in New York occurred; 1850, began the long series of "farewells" to the theaters in England which terminated at Drury Lane, February 26, 1851.

Macrinus (mă-kri'nūs), **M. Opellius**, 164-218; Roman emperor; b. of humble parentage at Caesarea, Mauritania; entered the service of Plautianus, the favorite of Septimius Severus; became prefect of the praetorians, and was chosen emperor by them after the assassination of Caracalla, 217. Shortly after his accession he was defeated by the Parthians, and lost his influence with the army. The praetorians rose in rebellion, instigated by Elagabalus, and the emperor fled in disguise, but was discovered and put to death.

Macropodidae, family of mammals of the order *Marsupialia* and suborder *Syndactyli*, containing the kangaroos and kangaroo rats of Australia and New Guinea. They have immensely enlarged hind limbs, by means of which they progress by great leaps, and much reduced fore limbs, while the large, thick tail serves as a fulcrum for support, etc.; the head is comparatively small, and somewhat deer-like. The family is peculiar to Australasia and the islands of the Papuan Archipelago, and is rich in genera and species.

Madagas'car, largest of the African islands; in the Indian Ocean; separated from Africa by the Mozambique Channel, 250 m. broad; length, 975 m.; breadth at widest part, 358 m.; area, about 226,500 sq. m.; pop. (1907) 2,706,861; capital, Antananarivo; once had land connection with Asia, and probably also with Africa; coast on the W. side much indented, with good harbors; on the E., generally low, with sand plains and swamps and many lagoons and lakes; interior a plateau 3,000 to 4,000 ft. high, traversed from N. to S. by a mountain chain whose peaks rise from 6,000 to 12,000 ft., and which in the NE. separates into many ranges; only navigable rivers, the Tsidsuba (or Menabe) and the Mangooka (or St. Vincent's), on the W. slope; climate of much of the interior plateau healthful; rainy sea-

son from December to April; chief occupations of people, cattle breeding and agriculture. The minerals include iron, copper, lead, silver, rock salt, sulphur, niter, manganese, zinc, antimony, nickel, graphite, coal, and gold.

The soil is very productive. Ebony, mahogany, gum trees, figs, coconuts, breadfruit trees, plantains, and bananas abound. Rice, arrowroot, yams, rubber, vanilla, cotton, sugarcane, tea, coffee, tobacco, cloves, mulberry trees, and sweet potatoes are cultivated. The inhabitants fall ethnologically into two groups—the black, or African, on the W. slope, and the light-colored, or Malayan, on the E. The Hovas, of the latter group, are the ruling tribe. The island was known to Europeans in the thirteenth century, but was first visited by them, 1506, Lorenzo de Almeida, the first Portuguese Viceroy of India, being the discoverer. Attempts at colonization by the Portuguese, French, and English failed. In 1745, 1768, the French succeeded in founding colonies on the island of St. Mary, and at Fort Dauphin, under Radama I (1808-28), one of the native kings, British Protestant missionaries established themselves; the native language was reduced to writing, a large number of the people were Christianized, the slave trade, infanticide, and polygamy were abolished, at least nominally, and British artisans gave instruction in the useful arts. In 1835, under Ranavalona I, widow and successor of Radama, Christianity was declared illegal, the missionaries were expelled, and the converts persecuted.

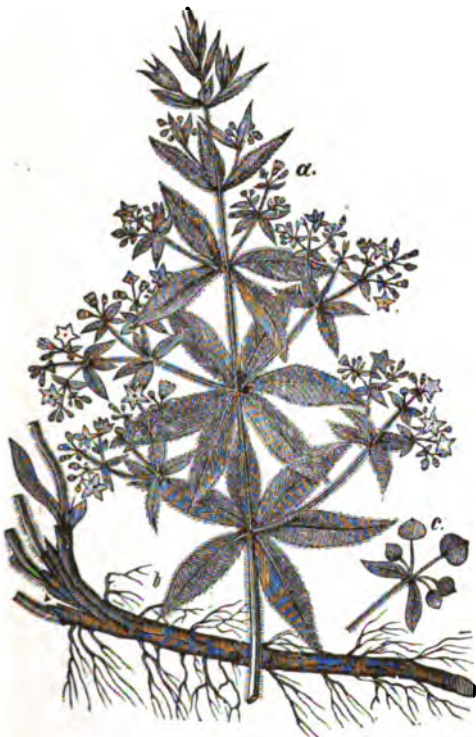
Under Queen Ranavalona III, who ascended the throne 1868, persecution ceased and Christianity was made the state religion. By the treaty of December 12, 1885, Madagascar was nominally placed under French protection, but the Hova Govt. soon disavowed the protective feature of the treaty, and, 1894, France sent out a punitive expedition, which captured the capital, Antananarivo, 1895, and forced the Hovas to recognize the protectorate. In 1896 France declared Madagascar and its dependencies a French possession, and the queen was exiled. The French have established primary schools, normal schools, a medical school, a technical school, etc.; have built excellent roads, and carried out other public works, including canals and railroads. The chief imports are from France, England, the U. S. (mostly cotton cloths), and Germany. The value of imports (1909) was \$6,636,000; of exports, \$6,488,000. Tamatave, on the E. coast, trades with Europe, Muscat, Zanzibar, and the Cape of Good Hope.

Madar'. See MUDAR.

Maddaloni (măd-dă-lō'nē), town in province of Caserta, Italy; about 18 m. N. of Naples. Its chief interest for the visitor is the grand Carolino aqueduct, built abt. 1755, which brings the waters of the Tiburno to Caserta (3 m. from Maddaloni), where they form a fine cascade that supplies the lakes and fountains of the royal palace gardens. Pop. (1901) 20,682.

Mad'der Fam'ily, *Rubiaceae*; one of the largest of the families of dicotyledonous plants, in-

cluding about 4,500 species of mostly tropical herbs, shrubs, and trees. The madder (*Rubia tinctorum*), a native of the S. of Europe and W. Asia, is grown in many parts of the world for its roots, which yield a red dye. Several species of S. American trees of the genus *Cin-*



RUBIA TINCTORUM.

chona yield Peruvian bark, from which is extracted the drug quinine. The coffee tree (*Coffea arabica*) is a native of Abyssinia, now grown in many tropical countries. The emetic drug ipecacuanha is derived from the roots of a semishrubby Brazilian species of *Uragoga*. Bedstraw (*Galium*), bluets (*Houstonia*), and button bush (*Cephalanthus*) are common representatives in the U. S.

Madeira (mă-dê'ră), Portuguese island in the N. Atlantic Ocean; about 360 m. from the coast of Africa and 480 m. from Santa Maria, the nearest of the Azores; area, 314 sq. m.; pop. (1900) abt. 150,600; capital, Funchal. The island is of volcanic origin, though earthquakes occur very seldom. The average elevation is 2,000 ft. and the surface mountainous. The coasts are steep, precipitous, and afford but few harbors. In the interior the land reaches its greatest height in Pico Ruivo, 6,050 ft.; it is everywhere intersected by deep, well-watered, and fertile valleys. The climate is equable, the average heat in the summer being 74° and in the winter 64°. In the valleys tropical plants are grown—rice, sugar, coffee, bananas, pineapples, and oranges; on the more elevated fields vines, chestnuts, and wheat are culti-

vated, and the tableland is covered with fine forests and extensive pastures. The inhabitants are a mixture of Portuguese, Moors, and negroes. Madeira was discovered, 1416, and soon after colonized by the Portuguese.

Madeira, river of S. America, the largest affluent of the Amazon, formed by the united waters of the Madre de Dios (about 700 m. in length), Beni (about 950 m.), Mamoré, and Guaporé. The Madeira proper begins at the confluence of the Mamoré and the Guaporé, about lat. 12° S., and falls into the Amazon midway between Manáos and Serpa, about lat. 3° 30' S., after a course of 750 m.; but its entire course is reckoned at 2,000 m. At its mouth it is 2 m. wide and 65 ft. deep; 500 m. up its width is 1 m. and its depth 100 ft.; and were it not for a series of magnificent cataracts commencing about 480 m. from the Amazon, vessels of almost any size might sail up into the very heart of Bolivia. The river derives its name from the vast quantity of wood that floats down its stream.

Maderno (mă-dêr'nô), Carlo, 1556-1629; Italian architect; b. Bisasone; succeeded Giacomo della Porta as architect to St. Peter's, and altered the designs of Bramante, Peruzzi, and Michelangelo. The choir and cupola of St. Giovanni dei Fiorentini, the façade of Santa Susanna, the Church of La Vittoria, and that of Sta. Chiara are his works. He finished the Quirinal Palace, the Borghese Palace, the tribune of Sta. Maria della Pace, and numerous others, besides making designs which were carried out in other cities of Italy, France, and Spain.

Madison, James, 1751-1836; fourth President of the U. S.; b. Port Conway, Prince George Co., Va.; son of Col. James Madison, a prosperous planter; graduated at Princeton, 1771; was elected from Orange Co. to the Virginia Convention, 1776, and procured the passage of an amendment to the Declaration of Rights as prepared by George Mason, substituting for the word "toleration" (of Christians not connected with the Church of England) a more emphatic assertion of religious liberty. In the same year he was elected to the Virginia Assembly; 1777, to the Council of State, and, 1780, took his seat in the Continental Congress. As chairman of the Committee on Foreign Relations, he established the claims of the young republic to the territories between the Alleghanies and the Mississippi and to the free navigation of that river; as chairman of that on Ways and Means, was the principal author of the system of revenue then adopted. As a member of the Virginia Legislature, 1784-86, Madison promoted and aided the abolishment of the remnants of the feudal system in the form of entails, primogeniture, and state support given to the Anglican Church, presenting a "memorial and remonstrance" on the latter subject.

In 1785 he proposed a meeting of state commissioners to devise measures for more satisfactory commercial relations between the states; was a delegate to the National Constitutional Convention, 1787; was one of the chief framers of the Constitution of the U. S.,

and perhaps its ablest advocate in the pages of *The Federalist*. He was a member of the first four Congresses, 1789-97, in which he maintained a moderate opposition to Hamilton's financial policy, and, gradually identifying himself with the Republican party, became from 1792 its avowed leader.

Madison was the author of the celebrated "Resolutions of 1798" adopted by the Virginia Legislature, in condemnation of the Alien and Sedition laws, as well as of the "Report" (1800) in which he defended those resolutions, which is by many considered his ablest state paper. From 1801 to 1809 he was Secretary of State in Jefferson's Cabinet. Chosen President, 1808, by an electoral vote of 122 to 53, Madison was inaugurated at a period when the relations of the U. S. with Great Britain were becoming embittered, and his first term was passed in diplomatic quarrels, aggravated by the act of nonintercourse of May, 1810, and finally resulting in a declaration of war, June 18, 1812. In the autumn Madison was reelected by 128 electoral votes to 89 in favor of George Clinton. In 1815 a commercial treaty was negotiated with Great Britain, and, 1816, a national bank was incorporated by Congress. Madison yielded the Presidency, March 4, 1817, to his Secretary of State and intimate friend, James Monroe, and retired to his ancestral estate at Montpelier, Orange Co. For a long time he was rector and visitor of the Univ. of Virginia. In 1829 he sat in the state convention to revise the old constitution, but was too infirm to take part in the active work. His wife, Dorothy Payne, whom he married 1794, she then being a widow, Mrs. Todd, was celebrated for her beauty and accomplishments, and was long remembered in Washington as "Dolly Madison."

Madison, capital of the State of Wisconsin and of Dane Co.; 82 m. W. of Milwaukee; is on an undulating isthmus between lakes Mendota and Monona, 210 ft. above Lake Michigan, and has lakes Waubesa and Kegonsa in its immediate vicinity; is the seat of the Univ. of Wisconsin, the State Institution for the Insane, Soldiers' and Sailors' Home, U. S. Govt. Building, State Capitol in park of thirteen acres, county courthouse, and county jail; and has manufactures of agricultural implements, machinery, printing presses, dynamos, flour, beer, carriages and wagons, and foundry and machine-shop products. Madison became the state capital, 1836. Pop. at the 1910 census, 25,531.

Mädler (mäd'ler), Johann Heinrich, 1794-1874; German astronomer; b. Berlin. While holding a place in the normal school of his native city he, together with Wilhelm Beer, published, 1829-36, the celebrated chart of the moon, in four leaves, and, 1837, the explanation of the chart. In 1836 he obtained an appointment at the observatory of Berlin, and in 1840-65 was director of the observatory at Dorpat, in Russia. His "Central Sun" and "Researches into the System of Fixed Stars" were highly esteemed.

Mad'oc, legendary Welsh prince, who, according to Cambrian chroniclers, discovered

America more than three centuries before the discovery by Columbus (1170). He never returned from a second expedition. His landfall was supposed to be Nova Hispania or some part of Florida, since the Spaniards are said to have found there the traditions of a previous settlement by a strange race which had honored the cross. The decision of modern historical scholars is against the theory of Welsh discovery.

Madockawan'do, chief of the Etechemin Indians, on the Penobscot; figured prominently in the wars between the French and English colonies; and was the scourge of the New England frontier, 1690-94. The Baron de St. Castin married his daughter.

Madon'na, title of the Virgin Mary, and given especially to artistic representations of her. In mediæval times the Madonna was the symbol of glorified womanhood and maternity, and feelings of chivalric devotion, blended with religious reverence, made her a prominent subject of Christian art. Among the best known are three by Raphael—the famous "Sistine Madonna," now hanging in the Dresden Gallery, his "Madonna of the Chair," in the National Gallery, London, the "Madonna of the Garden," in the Paris Louvre; Botticelli's "Virgin with the Child and Little Saint John," in the Pitti Palace, Florence; Titian's "Assumption of the Virgin," in the Academy of Venice, and Murillo's "Immaculate Conception," in the Seville Cathedral. See MARIOLATRY; VIRGIN MARY.

Madras', native name CHENNAPATNAM, "Chennappa's City"; official name, Fort St. George, third city of India; capital of the presidency of the same name; on the Bay of Bengal. The city, built on a sandy plain only a few feet above sea level, consists of Fort St. George (the first British possession in India) and of twenty-three villages, which have grown together into one municipality. In the center of the town, but immediately on the sea, stands Fort St. George, which, besides the barracks for the British troops and other military institutions, contains the council house, the arsenal, St. Mary's Church, and other public buildings. To the N. of the fort, but separated from it by a large esplanade, is Blacktown, the native town, poorly built, but densely populated; to the E. along the shore it is lined with handsome public buildings and business offices; on the S. side of the fort, but separated from it by the Cooum River, is the Mohammedan quarter. Other noteworthy buildings are the High Court, the lighthouse, visible 20 m.; the Church of St. Andrew, St. George's Cathedral, mint (in Blacktown), Madras Club, observatory, Military Orphan Asylum, hospital, etc. Parks and gardens usually surround the private houses and contribute much to the beauty of the city.

Madras has large cotton mills, tanneries, ice factory, etc. It has several canals, the most important of which is the Buckingham, extending N. for 196 m.; is an important railway center, and is in direct steam communication with Europe and the principal ports of the East. It



MADONNA AND CHILD.—BELLINI.
THE ACADEMY, VENICE.



THE MADONNA OF THE CHAIR.—RAPHAEL.
THE PITT I GALLERIES, FLORENCE.



MADONNA AND CHILD.—MIGNARD.
THE LOUVRE, PARIS.



THE MADONNA OF THE GARDEN.
—RAPHAEL.
THE LOUVRE, PARIS.



THE HOLY FAMILY.—VAN DYCK.
THE PINACOTHEK, MUNICH.



THE VIRGIN, THE CHILD, AND
ST. JOHN.—BOTICELLI.
THE LOUVRE, PARIS.



THE ASSUMPTION OF THE VIRGIN.
—TITIAN.
THE ACADEMY, VENICE.



THE SISTINE MADONNA.—RAPHAEL.
MUSEUM, DRESDEN.



THE CONCEPTION OF THE VIRGIN.
—MURILLO.
MUSEUM, SEVILLE.



exports hides, spices, tea, coffee, indigo, cotton, and saltpeter, and imports cotton goods, canned goods, liquors, metals, horses, etc. Madras was founded, 1639, by Francis Day, of the E. India Company, who obtained a grant of land from the Rajah of Chandragiri in that year, and was made a presidency, 1653. In 1746 the fort was captured by the French, but restored two years later, and, 1758-59, it was unsuccessfully besieged by them. Pop. (1901) 509,346.

Madrazo (mā-thrā'thō), Federico de, 1815-98; Spanish historical and portrait painter; b. Rome, Italy; son of Don José de Madrazo (1781-1859), director of the Academy of Madrid and court painter to Ferdinand VII; studied under his father and under Winterhalter, in Paris; returning to Spain, was made court painter. His works include "Godfrey of Bouillon Proclaimed King of Jerusalem," "Maria Christina at the Sick Bed of Ferdinand VII," and portraits of Queen Isabella and of Fortuny, his son-in-law.

Madrazo, Raimundo de, 1841- ; Spanish portrait and genre painter; b. Rome, Italy; son of the preceding; was educated under his father and under Léon Cogniet, in Paris, where he spent the greater part of his life; awarded first-class medals, Paris Exposition, 1878-79; decoration of the Legion of Honor, 1878. His works include "After the Masked Ball," "Fête During the Carnival," "Andalusian Singer," "After Vespers," and many portraits, including some of prominent Americans.

Mad'repore, group of coral-forming polyps belonging to the order of *Hexactinia*. The term is usually restricted to the tree corals of tropical seas, but in the broader sense it includes the greater portion of the reef-building forms.

Madrid, capital of Spain and of the province of Madrid, a part of New Castile; is situated nearly in the center of the country; on the left bank of the Manzanares, a small stream which joins the Jarama and flows to the Tagus. The city is surrounded by a brick wall 20 ft. high and pierced by fifteen gates, of which the most remarkable is Puerta de Alcalá, 72 ft. high, at the foot of the street of Alcalá, which, three fourths of a mile long, traverses the city from NE. to SW., and forms one of the most magnificent streets in Europe. Among the public squares, of which Madrid numbers seventy-two, is the Puerta del Sol, once forming the E. entrance of the city. The government palace, the post office, and other public buildings are situated here; also the best clubs, hotels, and reading rooms. Plaza Oriente, situated between the royal palace and the royal theater, contains an equestrian statue in bronze of Philip IV; in the promenade skirting the place stand forty-four colossal statues of kings and queens. Plaza Mayor contains an equestrian statue in bronze of Philip III; here the so-called *autos-da-fe* were formerly celebrated. The bullfights take place in the Plaza de Toros, just outside Puerta de Alcalá. Among the numerous promenades and gardens, the Prado is the most remarkable—2½ m. long, planted with beautiful trees, and in part adorned with magnificent fountains and statues.

The royal palace, of granite and white marble, occupies an area of 220,900 sq. ft., and is surrounded with beautiful gardens. The royal museum has one of the largest and richest collections of pictures in Europe. Many of the churches, which number ninety, are beautifully decorated with paintings by the old masters, but none of them, excepting perhaps the cathedral, begun 1885, has architectural merit. The university, removed hither from Alcalá de Henares, 1836, has about 5,000 students. Here also are a royal observatory, a national library of over 300,000 volumes, medical school, theological seminary, military, engineering, and architectural schools, schools of art, law, industrial art, normal schools, etc., and a botanical garden. The manufactured articles include chocolate, beer, tobacco, carpets, tapestry, shoes, hats, plated ware, coaches, gloves, jewelry, fans, and musical instruments. The commerce is important. The retail business is mostly in the hands of foreigners, especially Frenchmen; but wholesale transactions are carried on by native houses, and are very large, the city forming the entrepôt for the interior provinces. Madrid is first mentioned in history as a Moorish outpost, called *Majerit*, but was captured, 1083, by Alfonso VI of Castile. In 1560 Philip II made the place his capital. From this time it grew rapidly into a magnificent city, and became the center of the history of the Spanish people, political and literary. Pop. (1900) 539,835.

Mad'rigal, in music, the name of a certain species of composition, originally of a light, airy, joyous, and pastoral character. Madrigals are often of complex and elaborate structure, usually for voices alone, and consist of four, five, or more parts, in which the skill of the composer exhibits itself in fugues, canons, imitations, and other highly labored styles of writing. Compositions of this kind abounded in the sixteenth and seventeenth centuries, and in their production the best masters appear to have found a congenial field for the exercise of their ability. It is supposed by some writers that the madrigal originated in Flanders.

Madura (mā-dō'rā), island of the Malay Archipelago, NE. of Java, comprising an area of 1,700 sq. m., and belonging to the Netherlands. The inhabitants, numbering about 630,000, are Mohammedans, and live in three kingdoms governed by native princes under Dutch superintendence. The chief product is salt, the manufacture of which is a government monopoly; principle industry, cattle raising; most important towns, Bankalang (the flourishing, chief town of Madura proper), Pamakasan (containing the residence of the regent), Sumenep, and the European town of Marangan.

Madura, city of British India; province of Madras; capital of the district of Madura; 270 m. SW. of Madras; carries on a considerable trade in cotton and tobacco; and contains some remarkable Hindu buildings, among which are the magnificent Pandiyan Palace, the great temple of Mahadeva, and a celebrated choultry, or inn, for pilgrims. A Roman Catholic mission was started here, 1606, and continued till the middle of the eighteenth century, when the

wars between France and Great Britain stopped the work. It was resumed, 1837. In 1834 a Protestant mission was established by the American Board of Commissioners for Foreign Missions, which has under its charge numerous churches and schools, besides several dispensaries. Pop. (1901) 105,984.

Mæander, celebrated river in Asia Minor; rises in Phrygia at Celasæ (later Apamea-Cibotus, now Dineir). Numerous large springs burst forth from the mountainside, and when united form a large river at once. After leaving the Baklan Ovaſti at Demirdjikieui, it falls rapidly and cuts its way in a deep canyon through the mountains, emerging at Tripolis into the great fertile valley of the Mæander. The river is noted for its winding and tortuous course through this valley, and because of this peculiarity it has given its name to one of the most beautiful patterns of Greek ornamentation.

Mæcenas (mæ-sē'nās), Gaius Cilaius, d. 8 B.C.; Roman statesman and patron of letters; came of a noble family of Etruscan origin; was the most trusted adviser of the young Octavian; in 40 mediated between Sextus Pompeius and Octavian and brought about the marriage of Scribonia, a connection of the former, with the latter. During the absence of Octavian, 38 B.C., he was his official representative, and in 31 he shared the same responsibility with Agrippa. In 16 B.C. a difference with Octavian arose, and Mæcenas retired to private life. He was the creator and center of the most brilliant literary circle in Rome's history—a circle composed of such men as the tragic poet Varius, Virgil, Horace, and Propertius.

Maelström, or **Malström** (mål'strüm), according to legend, a tremendous whirlpool on the W. coast of Norway, immediately S. of Moskøe, the extreme S. island of the Lofoden group. The legend tells that whales, men-of-war, etc., when caught by the vortex, are ground to pieces as fine as dust. There is, however, no whirlpool at all; but the currents which run here are very strong; and when, as often happens, the wind blows from just the opposite direction to that of the current, the agitation of the sea may become very heavy, and even dangerous to small vessels.

Maeterlinck (mæt'ér-lingk), **Maurice**, 1862-; Belgian author; b. Ghent, of burgher stock; became a lawyer; during a residence in Paris, 1886, came much under the influence of Villiers de l'Isle-Adam; returned to Ghent to become one of the school of poets calling itself "La Jeune Belge." His works include the so-called dramas "The Blind," "The Intruder," and "The Princess Maleine"; several volumes of poems, "The Life of the Bee," "Old-fashioned Flowers," "Wisdom and Destiny," and essays.

Mafia (mä'fē-ä), Sicilian secret society having for its aim the substitution of its own authority for that of the law. Italian emigrants have founded branches in New York, New Orleans, and other cities of the U. S.,

where their members are thought to foster and protect crime. In New Orleans the suspicion felt for the Mafia broke out into open and violent hostility on the occasion of the murder of the chief of police by members of the society, 1890. Enraged at the acquittal of some of the accused, a mob broke into the jail and murdered eleven of the prisoners, including those who had been acquitted. In consequence of the delay in bringing to justice the authors of the disturbance, the Italian Govt. protested against this violation of the rights of Italian residents, but the matter was amicably arranged, the U. S. agreeing to indemnify the relatives of the victims.

Magalhães (mä-gäl-yñs), **Fernão de** (Spanish, **FERNANDO DE MAGALLANES**; by English and French authors commonly called **FERNAND MAGELLAN**), abt. 1480-1521; Spanish discoverer; b. Sabarosa, Traz-os-Montes, Portugal; served in the E. Indies, 1505-12; conceived the idea of finding a W. route to the E. Indies, and, being in ill favor at court, renounced allegiance to Portugal and went to Seville. He secured the favor of Charles V, who fitted out a government squadron under command of Magalhães, which sailed September 20, 1519. The Bay of Rio de Janeiro was reached December 13th; the Rio de la Plata (already known) explored, January 10-February 7, 1520; the unknown coast of Patagonia followed; the entrance to the strait which Magalhães called Todos los Santos, but which has since borne his name, discovered October 21st; the W. end of the strait reached November 28th. Sailing N. and later NW. and W., Magalhães discovered the Ladrões, and, March 16, 1521, Samar, one of the Philippines. He was killed in a fight with the natives of Mactan, a neighboring island. This expedition gave to the world the first distinct knowledge of the Pacific, and the Spanish discovery of the Philippines led to their colonization soon after.

Magallanes (mä-gäl-yñ's), territory of Chile, including all the mainland and islands of the republic S. of lat. 47° to Cape Horn; bounded W. by the Pacific and E. by the main ridge of the Andes as far as lat. 52° S., beyond which the Chilean territory extends to the Atlantic, thus embracing the whole of the Strait of Magellan and most of the Fuegian Archipelago; area, officially estimated, 71,105 sq. m.; pop. (1905) 13,144. The whole region is mountainous, and the coast is broken by a multitude of inlets, channels, and fiords, resembling those of Norway. The islands on the Magallanes coast were nearly all named by English explorers. The line begins at the N. with the Wellington group, in which the principal mass is Wellington Island. S. of this is the Madre de Dios Archipelago, then Queen Adelaide Island, separated by a channel which leads to the Strait of Magellan, the latter cutting off the group known as Tierra del Fuego. Small islands to the S. of Tierra del Fuego are the extreme S. outlying fragments of S. America, Horn Island, the extreme S. rock being the so-called Cape Horn. The extreme S. point of the continent is Cape Froward, on the Magellan Strait.

Magazine' Guns, small arms which deliver projectiles in rapid succession, the cartridges being delivered automatically from a magazine or hopper. The earliest magazine guns had tubular magazines in which the cartridges were placed end to end, the magazine being situated in the buttstock, as in the Spencer, or under the barrel, as in the Henry. The two guns were invented in the U. S., and were the earliest adopted for actual use in war. They were used during the Civil War in the U. S. From the Henry magazine gun was developed the Winchester, still in use for sporting purposes, and a magazine gun of this nature, the Vetterlin, was soon after used in Switzerland. Though the tubular magazine is still used in some countries, the modern military magazine is of entirely different type. It is a "box magazine," so called, in which the cartridges are placed side by side instead of end to end, thus making a magazine of compact and convenient form which can be rapidly refilled when empty, or which can be readily detached from the gun and replaced. With the tubular magazines the operation of filling was slow and tedious, as the cartridges had to be pushed in singly, endwise; so that magazines of such form were practically useful only as a reserve; for, being once emptied, were no better than single-loaders, unless time was allowed for refilling. With box magazines, the rapidity of the operation of refilling or replacing the magazine make it unnecessary to keep a large reserve of cartridges in the magazine. The accepted form of breech mechanism for military magazine guns is the bolt system, the box magazine being so placed as to feed through the breech housing into the "receiver"—the space just in rear of the barrel and in front of the bolt, when the bolt is drawn back.

For sporting purposes tubular magazines are still much used, especially those which are operated by slides in place of the levers of older types. Two forms of this class are popular on shotguns, and even on rifles. The first, illustrated by the Spencer repeating shotgun, the earliest gun acting on this principle, has a handle operated by the left hand, sliding along the barrel underneath, and this method has been adopted by the Winchester and Colt Arms companies. In the second form, the Burgess, the handle, which carries with it the trigger, slides along the small of the stock, being operated by the right hand, leaving the left hand in place to steady the barrel.

The type of rifle adopted by the principal nations of the world, at the time of writing, is shown in the following table, the weights being given in even pounds, though gener-

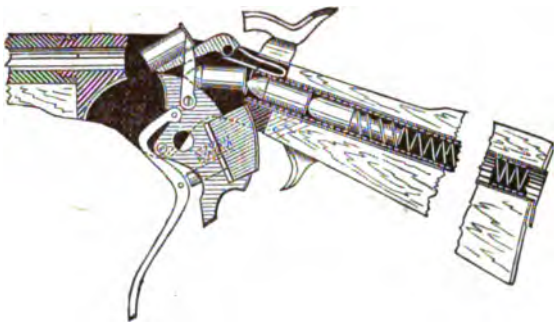


FIG. 1.—SPENCER MAGAZINE GUN.

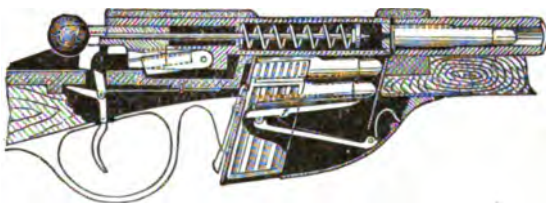


FIG. 2.—MANNLICHER GUN (Austrian).



FIG. 3.—MANNLICHER GUN (German form).



FIG. 4.—MAUSER GUN.



FIG. 5.—KRAG-JØRGENSEN GUN (Norway and U. S. Service).

ally a few ounces over, and do not include bayonets:

COUNTRIES.	GUN.	Weight.	Rounds.
		Lbs.	
U. S. Army.....	Krag-Jørgensen.....	9	5
U. S. Navy.....	Lee.....	5	5
Argentina.....	Mausier.....	5	5
Austria-Hung.....	Mannlicher.....	5	5
Brazil.....	Mausier.....	5	5
Belgium.....	Mausier.....	5	5
Bulgaria.....	Mannlicher.....	5	5
Canada.....	Lee-Enfield.....	9	5
Colombia.....	Mausier.....	5	5
China.....	Lee.....	5	5
Chile.....	Mausier.....	5	5
Denmark.....	Krag-Jørgensen.....	9	8
France.....	Lebel.....	9	8-10
Germany.....	Mausier.....	9	5
Great Britain.....	Lee-Metford.....	9	8-10
Greece.....	Gras.....	9	1
Netherlands.....	Beaumont-Vitali.....	9	4
Italy.....	Mannlicher-Carcano.....	8	6
Japan.....	Murata.....	8	8
Mexico.....	Mondragon.....	8	5
Morocco.....	Mausier.....	8	5
Norway.....	Krag-Jørgensen.....	8	5
Portugal.....	Kropatchek.....	8	8
Peru.....	Mannlicher.....	10	5
Persia.....	Mausier.....	9	5
Paraguay.....	Mausier.....	8	5
Roumania.....	Mannlicher.....	9	5
Russia.....	Mouzin.....	8	5
Spain.....	Mausier.....	8	5
Sweden.....	Remington.....	8	5
Siam.....	Mannlicher.....	8	5
Switzerland.....	Schmidt-Rubin.....	8	12
Turkey.....	Mausier.....	9	5

See ARTILLERY, MACHINE AND RAPID-FIRE GUNS.

Magdala (măg'dă-lă), town in Shoa, Abyssinia; 300 m. S. of Annesley Bay, on the Red Sea; is built on the site of a fortified town of the same name, on a mountain peak 9,110 ft. above sea level, where a number of British subjects were imprisoned by King Theodore, 1868; an expedition under Gen. Sir Robert Napier rescued the prisoners and demolished the town and its defenses, the king killing himself in the battle. Napier was created Baron of Magdala. The new town is now a place of commercial importance.

Magdalena (măg-dă-lă-nă), most important river of Colombia, forming, with its branches, the principal fluvial system of NW. S. America. The main river is about 1,050 m. long, and lies between the central and E. Cordilleras of the Colombian Andes. It discharges into the Caribbean Sea by two principal mouths. Seagoing vessels ascend to Barranquilla, at the parting of these mouths. Light-draught steamboats ascend to Honda, abt. 600 m. The river is the main highway to the populous plateaus of central Colombia, and must remain so until railways are built. Of the many affluents, the most important is the Cauca.

Magdalene (măg'dă-lën), or **Ma'ry Magdalene**, woman who stood by Jesus at the cross; was present when Joseph of Arimathea laid Him in the sepulcher; came early on the first day of the week to the tomb and found it open; went to Peter and John, and saw the two angels sitting in the sepulcher when she

returned with the apostles. Jesus Himself appeared to her shortly after, and announced His approaching ascension.

Magdalen Islands, group of islands in the Gulf of St. Lawrence, nine in number, formerly, with one exception, united into one and called Magdalen Island. The group is 57 m. long by 14 broad, and about 50 m. from Prince Edward Island and 60 from Newfoundland. Fishing and agriculture are the industries. Pop. 6,100.

Magdeburg (măch'dé-bôrch), city of Prussia, capital of the province of Saxony; on the Elbe; 72 m. N. of Leipzig; was founded in the tenth century by Otto the Great, and consists, besides its two suburbs, Neustadt and Sudenburg, of four parts—Altstadt and the Sternschantze, on the left branch of the Elbe; the citadel, on an island in the river, and Friedrichstadt, on the right bank. Each of these parts is strongly fortified, making Magdeburg one of the strongest places in Europe. On account of its position on the Elbe and at the junction of four principal railway lines, it is one of the commercial centers of N. Germany. Pop. (1910) 279,685.

Magdeburg Centuries. See CENTURIES OF MAGDEBURG.

Magellan, Ferdinand. See MAGALHÃES, FERNAO DE.

Magellan, Strait of, channel between the S. end of the S. American continent and the islands of Tierra del Fuego, connecting the S. Atlantic and Pacific oceans; extreme length, about 370 m.; width, from 2 to over 20 m. The strait lies entirely within Chilean territory, but is a free waterway; its only port of importance is Punta Arenas. The passage was discovered, 1520, by Magalhães.

Magen'ta, town; province of Milan, Italy; about 18 m. W. of the city of Milan, in a fertile district, watered by the Naviglio Grande; has been the theater of many battles, the most memorable being that fought June 4, 1859, in which the Austrians were defeated by the Italians and French, and thus forced to evacuate Lombardy. Marshal MacMahon received his title, Duke of Magenta, from this town. Pop. (1901) 7,974.

Maggiore (măd-jô-rë), longest of the lakes of N. Italy; between Piedmont, Lombardy, and the Swiss canton of Ticino, and traversed, or rather formed, by the Ticino River, which carries its waters to the Po; is 39 m. in length; varies from half a mile to 5½ m. in breadth; and is remarkable for the beauty of its scenery—wild, rugged granite mountains alternating with vine-clad hills.

Magi (mă'ji), priestly caste of the ancient Persians. Magism was the old Scythic religion, which maintained itself in Persia after the Aryan conquest, and grew in power and influence until Gomates, a Magus, was raised to the throne as the successor of Cambyes. He was speedily overthrown and slain by Darius Hystapis, and the Aryan religion was restored in triumph over Magism. The wisdom of the Magi caused a secret knowledge of re-

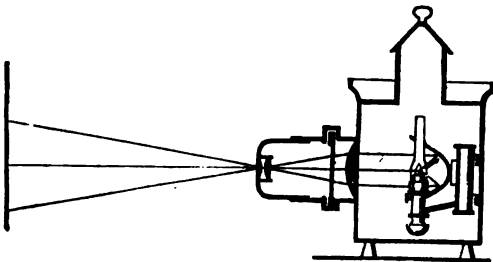
ligion and philosophy to be ascribed to them. The name in later times was applied to diviners and sorcerers of every nation.

Magic, as explained by its adepts, the traditional science of the secrets of nature, embracing all knowledge and constituting the perfection of philosophy; also the art of exercising preterhuman powers by means of occult virtues and spiritual agencies. Magic was used at a very early period to designate all occult science, natural or supernatural, including enchantment and any extraordinary operations like those pertaining to alchemy. Later it was applied by the vulgar to all necromancy and witchcraft. Cornelius Agrippa reckons several different kinds of magic, but these are generally reduced to two: white or divine magic, or magic within its proper province, and black or infernal magic, to which belong palmistry, the evil eye, the command of the elements, the power of transforming human beings into animals, etc. A complete knowledge and mastery of nature is the transcendent claim of magic. To know things secret and future, to command the elemental spirits, to heal the sick, to provide charms and talismans which shall mysteriously sway the will of others, render oneself invulnerable, and raise tempests, to constrain the devil into service, to evoke the dead, to possess the philosopher's stone and the elixir of life, are the usual objects of magical arts.

The practice of magic is traceable to the East, where it still remains in vogue. It played an important part in the religious doctrine and ritual of the Persians; and the Jews brought back Persian ideas with them, and practiced in secret the arts which the law forbade. The Greeks applied it to all divinations and thaumaturgy. The Romans were thoroughly imbued with it, and the mythologies of the Germans, Slavs, and Celts show the influence of similar ideas. Christianity renewed the Mosaic interdiction of magical arts, ascribing their marvels to malignant spirits. In the fourteenth century magic rose into repute as a lawful art, and sovereigns maintained magicians at their courts. Though the legitimacy of magic was disputed, its realization as an art and a science was scarcely doubted down to the eighteenth century. See DEMONOLOGY; INCANTATION; WITCHCRAFT.

Magic Lan'tern, or Stereopticon (stê-rê-ôp'ti-kôn), optical instrument intended for exhibiting, by means of lenses, magnified images of transparent pictures. It is constructed in accordance with the optical principle that, when any object, as a picture, is brought on one side of a convex lens, and at a distance slightly greater than its focal length, such object or picture will be reproduced upon a white screen placed at a certain distance on the opposite side of the lens. The glass slide, containing the photograph or other pictured representation, in an inverted position, is placed in front of a lens which is set in the side of a dark lantern, and illuminated by a lamp with a reflector behind it. In the tube in front of the slide is a second convex lens, a little farther than its focal length from the picture, by which the

rays are converged and made to cross, throwing the erect image on the screen. A popular use of the magic lantern is for the production of the optical illusions called "dissolving views." For these, two lanterns are necessary, placed either side by side or one above the other. They must be adjusted in position so as to have a common luminous field upon the screen.



MAGIC LANTERN.

Each has a different object, and the two images when superposed to a great extent obliterate each other. A sliding or rotating stop placed before the lanterns is so constructed as, on being moved to left or right, to close the aperture of the one while it opens that of the other. At the mean position both are half open and half closed; at either extreme position, one is wholly open and the other wholly closed. The movement of this stop therefore causes the images alternately to come out distinctly and to melt away. Advantage is taken of the moments when the lanterns are successively closed to change the objects, so that each dissolution is followed by the presentation of a new picture.

Magic Square, arrangement of numbers from 1 up to 9, 16, 25, or any other square number in the form of a square, so that the sum of those contained in any straight line, horizontal, vertical, or diagonal, shall be the same. The most familiar form of magic square is that made with the nine digits, arranged as in the diagram.

Here the digits are placed in a square, with three on each side. It will be seen that, in whatever way they are added, the sum of any three which lie in a straight line amounts to 15.

The following shows how a magic square with five numbers on a side may be formed:

Write the five numbers 1, 6, 11, 16, 21, in five of the squares, putting 1 anywhere we please, 6 in the square two lines to the right, and one below from 1; then write in 11 at the same distance from 6, and so on with 16 and 21, but going back or up five lines when a number falls in line outside of the diagram. Then fill in the numbers 2, 3, 4, 5 by continually counting two lines below and one to the right from 1. Start from 6, 11, etc., in the same way. The same system may be applied to squares of any prime number of sides.

6	1	8
7	5	3
2	9	4

1	24	17	15	8
20	13	6	4	22
9	2	25	18	11
23	16	14	7	5
12	10	3	21	19

Magna Charta (mäg'nä kār'tä), Latin, the "Great Charter," charter of liberties originally granted by King John (1215 A.D.) to the clergy, barons, and freemen of England. The tyrannical character and oppressive acts of the king and his open violation of all law, aroused an opposition among the clergy and barons at an early period in his reign; but it was not until the barons with an army of knights and yeomen entered London that the king yielded to the popular demand. The Great Charter was consummated and the royal seal affixed at Runnymede on the 19th, although it bears the date of June 15, 1215, the day on which the negotiations were begun. By far the greater part of its provisions had reference to the laity, and they may be separated into two groups—namely, those which legislated for certain designated classes, and especially for the barons as tenants of the crown, defining, regulating, and limiting their feudal burdens and duties; and those which legislated for the whole nation, for the entire body of freemen. The former were based on the existing social condition, and they ceased to be operative with the extinction of the feudal system. The latter remain in full force and effect as the very foundation and security of civil liberty in Great Britain, and the most important and comprehensive of the clauses have been incorporated into all the constitutions, national and state, of the U. S.

The Magna Charta has been confirmed over thirty times by English sovereigns succeeding John, though not in its entirety. The original form contained sixty-one chapters or articles, but many of these related to personal acts of John and established a commission of twenty-five barons to enforce its provisions if the king did not keep his promise. The articles relating to feudal conditions became obsolete when the feudal system died out, but the twelfth which enacts that "no scutage or aid shall be imposed in our kingdom unless by the general council of the kingdom" except for those specified purposes is the germ of the constitutional principle that no taxes shall be laid except by the consent of the persons to be taxed expressed through their representatives. By far the most important articles of the charter are the thirty-ninth and fortieth. These contain the sure guaranty of every civil right and liberty. The following is the authoritative translation of this capital provision, as found in the English book of statutes: "No freeman shall be taken, or imprisoned, or be disseised of his freehold, or liberties, or free customs, or be outlawed or exiled, or any otherwise destroyed; nor will we pass upon him or condemn him, but by lawful judgment of his peers, or by the law of the land. We will sell to no man, we will not deny or defer to any man, either right or justice."

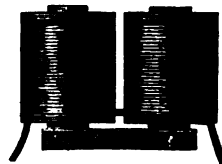
Magna Græcia ("Greater Greece"), collective name of the ancient Greek cities and districts in S. Italy (according to Strabo, also of those in Sicily), applied chiefly to the cities on the Tarentine Gulf (Tarentum, Sybaris, Croton, Metapontum, Locris, Rhegium, etc.) and on the W. coast (Cumæ, Neapolis, etc.).

Improperly the name is used also for the whole S. of Italy.

Magne'sia, name of two ancient cities in Asia Minor—(1) a city of Ionia lying on the Mæander, not far from Miletus and Ephesus, famous for its temple of Artemis (Diana); (2) a city (the modern Manisa) of Lydia, N.E. of Smyrna, at the foot of Mt. Sipylus, celebrated for the battle which was fought here, 190 B.C., between the two Scipios and Antiochus the Great, of Syria, by which the Romans laid the foundations of their rule in the East.

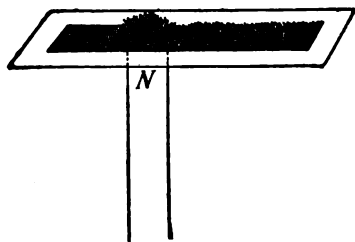
Magnesium (mäg-nē'zhī-ūm), an element, the metallic base of magnesia; symbol, Mg; Davy proved its existence, but Bussy, 1830, first obtained it in sufficient quantity to test its properties. He decomposed the chloride of magnesium by transmitting through it when heated the vapors of potassium. It is now found in the salt mines at Stassfurt in a double chloride of potassium and magnesium, called carnallite. Magnesium resembles silver, is malleable and ductile, fuses at a dull red heat, and can be distilled like zinc. At a red heat, in contact with the air, it bursts into a brilliant white flame and burns to an oxide. It is used for flash lights where intense illumination is required for a short time. Several salts of magnesia are used in medicine, the most important being the oxide, carbonate, sulphate, and citrate. The oxide and carbonate are chiefly used as antacids, the sulphate and the citrate as aperients. Magnesia in combination with silica enters largely into the composition of many rocks and minerals, such as serpentine, steatite or soapstone, asbestos, meerschauum, augite, hornblende, and olivine.

Mag'net, a name which from early times has been applied to the loadstone or native magnet, an ore consisting of the magnetic oxide of iron, Fe_2O_3 , more properly termed magnetite. This ore is extensively distributed over the globe, and its peculiar property of attracting metallic iron has been known from the remotest antiquity. The loadstone has from nature its two poles, a N. and a S., fixed definite points in the stone; the force of the stone, however, does not emanate from a mathematical point, but from the parts themselves, and from all of these parts. These poles point toward the poles of the earth, and move toward them, and are subject to them. Midway between the poles there is a place of no attraction, called the equator. The line connecting the imaginary poles is called the magnetic axis. A magnetic substance (such as a mass of soft iron) has no poles nor equator, and will attract either pole of a magnet to whatever part the magnet is presented. A magnet, on the other hand, attracts only at its poles which display opposite properties, the one attracting and the other repelling a given pole of another magnet brought near, like poles repelling and unlike attracting. If a piece of



ELECTRO-MAGNET.

iron or steel be rubbed by a magnet it will become magnetized. This method of magnetizing, or of producing an artificial magnet, has been supplanted for the most part by methods in which an electric current is used.



MAGNET POLARIZING IRON FILINGS.

The discovery of Oersted (1819), that magnetic influences surrounded a conductor carrying an electric current, led to the discovery by Arago that a needle placed at right angles to the conductor becomes magnetized, and the further discovery by Ampère that if a number of turns of wire be substituted for the straight conductor, the magnetizing power will be increased. These principles led to the electro-

soft iron be uniformly sifted over a plate of glass, we shall observe that the distribution of the filings is influenced by the position of a magnet introduced beneath. The approach of the magnet is first indicated by a bristling of the iron filings. If the plate be gently vibrated the filings will arrange themselves in a system of lines, more or less regular. A magnetic field may be defined as any space throughout which there exists a magnetic force, while a line of magnetic force is a line drawn through a magnetic field in the direction of the force at each point through which it passes. When a current is caused to flow in a conductor it produces a magnetic field in the surrounding region, and stores up a certain amount of energy in this magnetic field which depends upon the value of the current and the self-induction of the circuit. This energy is kinetic, and when the current decreases this energy is returned to the circuit, and tends to maintain the flow of current, just as the kinetic energy of a revolving fly wheel tends to maintain the rota-



DIRECTION OF CURRENTS AROUND THE POLES OF AN ELECTRO-MAGNET.

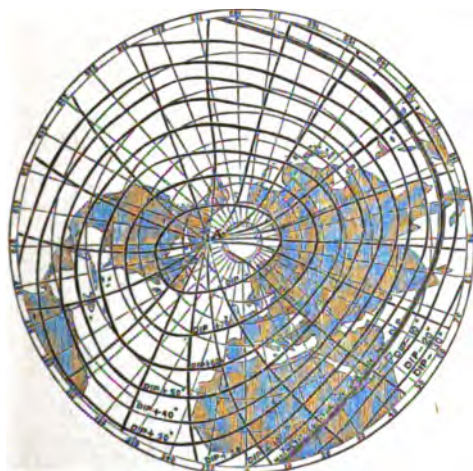


FIG. 1.—NORTH MAGNETIC POLE.

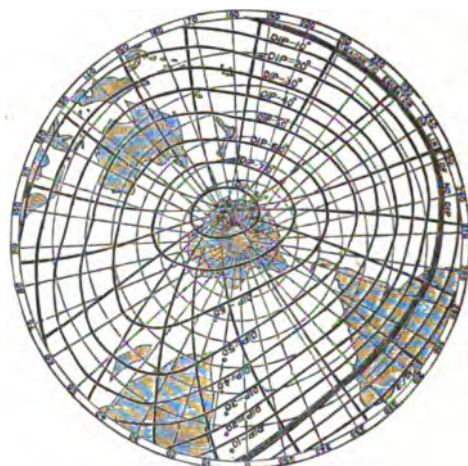


FIG. 2.—SOUTH MAGNETIC POLE.

magnet, first constructed by William Sturgeon, and described by him before the Society of Arts in 1825. An electro-magnet is simply a piece of iron surrounded by a magnetizing coil of wire carrying a current. The polarity of an electro-magnet depends upon the direction of the current magnetizing it. The tractive power of a magnet depends upon the magnetic induction and the polar surface. See **LOADSTONE**.

MAGNETISM is a term applied to the phenomena observed in the region surrounding a magnet and in the neighborhood of a conductor conveying an electric current. In these regions there exists a magnetic force which acts upon a magnetic substance (such as a compass needle or iron filings) or upon a wire carrying a current of electricity. If fine filings of

tion of the wheel when slowing down. The energy of the field increases and decreases with the current, and its rate of change depends upon the value of the current and also upon its rate of change. See **ATTRACTION; MAGNET; MAGNETISM, TERRESTRIAL; LOADSTONE**.

Magnetism (Terrestrial), the magnetic force exerted by the earth, recognized by its effect upon a magnetic needle. Gilbert discovered that the needle of the compass (magnetic needle) points N. and S. because the earth itself is a great magnet, having a N. and S. pole. The magnetic poles of the earth do not correspond exactly to the geographical N. and S. poles. The magnetic N. pole is more than 1,000 m. away from the geographical pole, it being approximately in lat. 70° 5' N. and lon. 96° 40' W. In 1831 it was found by Sir J. C. Ross

to be just within the Arctic Circle, and in 1906 essentially corroborated by Capt. R. Amundsen. The location of the S. magnetic pole has not been definitely settled.

On account of the irregular distribution of the earth's magnetism there appear to be two S. magnetic polar regions; and, as a further consequence, the magnetic needle does not point to the true N. or S. at all points of the earth's surface. Therefore, in determining the true N. and S. line (meridian) by the magnetic needle, its deviation for the particular point on the earth's surface must be known or determined. The angle between the magnetic meridian and the geographical meridian of a place is called the magnetic declination of that place. The existence of this declination was discovered by Columbus in 1492, though it appears to have been known to the Chinese previous to that date. An instrument maker named Norman in 1576 discovered that a well-balanced magnetic needle tended to dip downward toward the N. pole. It was found that the dip varied at different points of the earth, and, like the declination, varied from year to year. For the meridian of New York in 1900 the declination was $9^{\circ} 12' W.$ and the dip $70^{\circ} 8' N.$

Magnetism, An'imal. See HYPNOTISM.

Magnificat, named from the first word in the Latin version, "*Magnificat anima mea, Dominum*" ("My soul magnifies the Lord"), song of the Virgin Mary, as recorded in Luke i, 46-55. This song, in thankfulness for the incarnation, must have formed a part of the worship of the Church from early times. It is first found prescribed about the year 506, when in France it was ordered to be sung at lauds. In the Eastern and Armenian churches it is still a lauds canticle. In the West it has during the last eight hundred years been sung only at vespers. A prominent place is given to this hymn in the vesper and other services of the Roman Catholic Church and the Church of England. It was omitted from the evening service of the Protestant Episcopal Church in the U. S. at the revision of 1789, but it forms a part of the prescribed evensong in the Standard of 1892.

Magnitude, anything that can be measured. Originally the term was applied to signify a portion of space possessing the three attributes, length, breadth, and thickness; by extension of meaning it has come to signify any quantity that can be expressed in terms of a quantity of the same kind taken as a unit. Lines, surfaces, and volumes are called geometrical magnitudes. An angle is also a species of geometrical magnitude. Time, weight, and numbers are arithmetical magnitudes.

Magnolia Fam'ily, small group of dicotyledonous trees and shrubs (the *Magnoliaceæ*), numbering about eighty-five species, natives of America, tropical Asia, Australia, and New Zealand. They have simple, alternate leaves, and flowers usually composed of many separate sepals, petals, stamens, and pistils. They are therefore to be considered as among the lowest of the dicotyledons. Of the thirteen genera now recognized, four are represented in the

U. S. by eleven species, viz.: *Liriodendron*, 1; *Magnolia*, 7; *Illicium*, 2; *Schizandra*, 1. Of the first there is but one species, *L. tulipifera*, the tulip tree of the E. U. S., one of the most



GREAT-FLOWERED MAGNOLIA.

stately, as well as useful, of forest trees. A variety of this species is found in China. The magnolias are remarkable for their fine foliage and large, beautiful flowers.

Magnus (mäg'nōs), Heinrich Gustav, 1802-70; German chemist; b. Berlin; studied chemistry under Berzelius in Stockholm, where he discovered the compound known as the green salt of Magnus; was appointed Prof. of Physics and Technology at the Univ. of Berlin, 1834. The most remarkable of his numerous researches were his experiments on the coefficient of the dilatation of gases, published 1841, a few days after Regnault's publication of the same results; and his experiments on the transmission of heat through gases, which gave rise to a controversy with Tyndall.

Magnusen (mäg'nōs-sēn), Finn, 1781-1847; Icelandic antiquarian; b. Skalholt; began to practice law in Iceland, 1803, but returned, 1812, to Copenhagen; was appointed Prof. of N. Antiquities, 1815, and keeper of the archives, 1842; principal works are a translation of the older "Edda," with accompanying commentaries; a critical exposition of the Scandinavian mythology, and "Priscæ Veterum Borealiæ Mythologiæ Lexicon"; but besides these he wrote a great number of essays relating to Icelandic literature, Scandinavian mythology, and N. antiquities, remarkable as well for learning as for critical acuteness.

Magnusson, Arni, 1663-1730; Icelandic scholar; b. W. Iceland, 1663; went to Copenhagen, 1683, and received employment first as secretary to Bartholinus, afterwards in the royal archives; was made Prof. of Philosophy and N. Antiquity at the university, 1701, and in the following year accompanied the royal commission of survey to Iceland, where he remained, with some interruptions, until 1712. During his stay in Iceland he made a unique

collection of Icelandic manuscripts, which he bequeathed, together with his whole fortune, to the university library.

Ma'gog. See GOG AND MAGOG.

Mag'ot. See BARBARY APE.

Mag'pie, name applied to various birds, mostly of the genus *Pica*, belonging to the crow family. The common magpie of Europe (*P. caudata*) is a bird well known for its cunning and mischievousness and its disagreeable, screaming voice. The *P. Hudsonica* of N. America is by some regarded as of the same species. The *P. Nuttalli* is a common Californian species. There are other species, nearly all of them Old World birds.



AMERICAN MAGPIE.

Magru'der, John Bankhead, 1810-71; American army officer; b. Winchester, Va.; graduated at West Point, 1830; captain of artillery, 1846; distinguished himself at Cerro Gordo and Chapultepec in the Mexican War; resigned, 1861, and entered the Confederate army as brigadier general; commanded at Yorktown till its evacuation; took part in the Chickahominy campaign; major general, 1862; assigned to W. Department, including Texas, Arizona, and New Mexico; recovered Galveston from the Union forces; and served chiefly in Texas to close of war.

Maguire, John Francis, 1815-72; Irish journalist; b. Cork; was proprietor and editor of the Cork *Examiner*; member of Parliament from 1852 till his death; several times Mayor of Cork; published "The Industrial Movement in Ireland in 1852"; "Rome and Its Ruler," which was enlarged under the title "The Pontificate of Pius IX"; "The Irish in America"; and "The Next Generation," a political novel.

Magyar (môd'yôr), László, 1817-64; Hungarian traveler; entered the Brazilian navy, 1844; became commander of the fleet of the negro ruler of Calabar, on the W. coast of Africa, 1847; crossed the table-land of Nano to Bihe, 1849; married a chief's daughter; explored the interior, 1850-51; afterwards held

office under the Portuguese at St. Paul de Loanda.

Magyars (măg'yärz), dominant people of Hungary, especially on the plain. Probably they are a Turkish people, though with decided Ugro-Finnish characteristics. They formerly occupied the steppes of S. Russia, but in the ninth century were forced over the Carpathians into the vast plain of the Danube, driving before them the Slavs who had previously occupied it. They became the terror of Europe, but later were Christianized and became the bulwark of Europe against the Ottoman Turks. They number about 6,000,000. See HUNGARY.

Maha-bhārata (mā-hā-bā'rā-tā), the great epic of the ancient literature of India. The Aryan tribes of the Vedas lived about the middle Indus and its Punjab affluents. Later they migrated to the SE. and established themselves on the upper course of the Jumna and Ganges, in Madhyadeśa, "The Mid-land." Foremost among these tribes were the Bhāratas, the Kurus, and the Panchālas. In this Mid-land were fought the battles of the Bhāratas; and here were told the tales of these battles and their heroes. The priests told stories and gave out riddles to one another to beguile the tedium of their sacrifices; and no less at the festivals of the chieftains or tribal kings were the tales of bygone times in order. These tales were probably first circulated in prose, until some more clever teller put them into simple and easily remembered metrical form. The eighteen-day battle of the Bhāratas forms the principal theme of the poem. It contains over 100,000 double verses, and certain parts are plainly very ancient; its present form probably dates from 1000 A.D.

Mahaffy, John Pentland, 1839-; Irish classical scholar; b. Chafonnière, Switzerland; graduated at Trinity College, Dublin, 1856; became Prof. of Ancient History there, 1871; numerous works include "Commentary" to Kant's "Critique"; "Social Life in Greece, from Homer to Menander"; "Rambles and Studies in Greece"; "Greek Life and Thought, from the Age of Alexander to the Roman Conquest"; "Greece Under Roman Sway," "Story of Alexander's Empire," "Old Greek Education," "History of Classical Greek Literature," "The Petrie Papyri Deciphered and Explained," "Empire of the Ptolemies," "An Epoch in Irish History," etc.

Mahanadi (mā-hā-nā'dē), or Mahānū'd'y, river of Hindustan; rises in lat. 20° 20' N. and lon. 82° E., flows with an E. course 520 m., through Berar and Orissa, into the Bay of Bengal, forming a large delta, subject to destructive inundations by the ocean; navigable for 300 m. during the rainy season; becomes almost dry during the remaining half of the year; river bed celebrated for the fine quality of diamonds found in it.

Mahdi (mā'dē), El, name applied by Mussulmans to Mohammed, twelfth and last Imam (high priest) of the family of Ali. In 873 he entered a cave at Sermen Rey, and was never seen again. His disappearance gave rise to wild

conjectures and theories by which more than once the Mussulman world has been convulsed to its center. The Shiite Mussulmans believe he still exists in the cave, and daily look for him to issue from it in pomp to rule over the earth. The orthodox Mussulmans say he will appear only at the end of the world, when he will be attended by 360 celestial envoys, will convert all mankind to Islam, and reign universally as the vicar of Jesus Christ. Many claiming to be El Mahdi have arisen at different times, and some have attained great power. The last of these pretenders, commonly called The Mahdi by Europeans, was Mohammed Achmet, b. Dongola, Nubia, 1842. He defeated four expeditions sent against him by the Egyptian Govt., captured El Obeid, capital of Kordofan, 1883, and annihilated the Anglo-Egyptian army commanded by Gen. Hicks Pasha, composed of 10,000 soldiers, with 40 European officers. In January, 1885, he captured Khartum, where Gen. Gordon Pasha was killed. The energetic interference of Great Britain then prevented the further spread of the insurrection. The Mahdi died of smallpox, 1885. His authority was supposed to be transmitted to a successor, who exercised his functions under the same name.

Mahmud (mä-môd') I, 1696-1754; Sultan of Turkey; son of Mustapha II; was raised to the Ottoman throne, 1730, by the janizaries, after the deposition of his uncle, Ahmed III; concluded a disastrous war with Nadir Shah of Persia, 1736. The Russians took Otechakov and Kinburn in 1737, but their Austrian allies were defeated by the Turks at Krotzka, 1739, and in the ensuing peace Austria relinquished Belgrade and other places, while the Russians retained all their conquests. Another war with Persia, commenced 1743, closed unfavorably for Turkey. Mahmud's internal government was comparatively good.

Mahmud II, 1785-1839; Sultan of Turkey; son of Abdul-Hamid I and brother of Mustapha IV, who ordered his death, 1807, but he was rescued and succeeded to the throne, 1808; was defeated in wars with Russia, 1809-12 and 1829; was compelled to sign the Peace of Adrianople, which secured the independence of Greece, in the latter year; was rescued from his rebellious vassal, Mehemet Ali, Viceroy of Egypt, 1832, only by the intervention of Russia, and a second rebellion of Mehemet Ali seemed about to give the death blow to the empire when Mahmud died.

Mahmud of Ghazni (gä'z'në), surnamed THE GREAT, abt. 971-1030; Sultan of Persia and first Mussulman Emperor of India; b. Ghazni, Afghanistan; son of Subuktigin; succeeded, 997; professed Islam; made fourteen generally successful expeditions, 1001-30, in which he accumulated enormous treasures, massacred vast numbers of Hindus, and extended his empire from the Caspian to the Ganges; and founded an academy, library, and fine museum of natural history at Ghazni.

Mahog'any, forest tree of the W. Indies and Central and S. America, growing also to some extent in Florida; scientific name, *Swietenia*

mahogoni; wood is of very beautiful reddish color, extremely hard, strong, and heavy, and so costly that it has long been used almost entirely as veneering; has for nearly three hun-



MAHOGANY.

dred years been a staple article of commerce, and is exported from Honduras, Cuba, Haiti, Jamaica, and S. America. The better sorts are called Spanish mahogany.

Mahom'et. See MOHAMMED.

Mahone (mä-hôn'), William, 1826-95; American military officer and politician; b. Southampton, Va.; graduated at the Virginia Military Institute, 1847; devoted himself to civil engineering; took part in the Confederate capture of the Norfolk Navy Yard, April 21, 1861; raised and commanded the Sixth Virginia Regiment; was engaged in most of the battles of the Peninsular campaign, those on the Rappahannock, and those around Petersburg; became major general August 12, 1864; commanded a division in Hill's corps, and at Lee's surrender was in command at Bermuda Hundred; after the war devoted himself to the development of Virginia railways; entered actively into politics; was the organizer and leader of the so-called Readjuster party; U. S. Senator, 1881-87.

Mahony (mä-hö'nI), Francis, abt. 1805-86; Irish journalist; b. Cork; became a priest in Rome, but abandoned his profession and joined the staff of *Fraser's Magazine*, his contributions to which were published as "Reliques of Father Prout," 1836. His Roman correspondence in the *London Daily News*, powerfully advocating the cause of Italy, was republished as "Facts and Figures from Italy, by Don Jeremy Savonarola, Benedictine Monk." He was for many years Paris correspondent of the *London Globe*.

Mahrattas (mä-rät'üz), people of central and W. India, who in the eighteenth century overran the greater part of the peninsula, placed the Mohammedan Empire of Delhi under tribute, and were for half a century the most formidable obstacle to British supremacy in India. Their origin, geographical and ethnological, and

their early history are alike unknown, but the evidence of physical characteristics, customs, religion, and language, combined with the feeble indications of tradition, would point to one (or several) of the numerous irruptions of Turanian races from central Asia prior to the rise of Mohammedanism, seventh century A.D.

Maia (mā'yā), in Greek mythology, eldest daughter of Atlas and Pleione, and therefore one of the Pleiades. She was beloved by Zeus, and in a cave of Mt. Cyllene, in Arcadia, she bore to him Hermes. The story of his birth and infancy is told in the beautiful hymn to Hermes sometimes ascribed to Homer.

Maid'enhair Fern, an ornamental plant—*Adiantum capillus veneris*—distributed throughout the Old World, as well as the warmer parts of America. The common maidenhair of the U. S. (*A. pedatum*) has delicately scalloped leaflets which spread horizontally. The leaflets are borne upon dark, wiry stalks, which are used in the making of basketry by the N. American Indians. The graceful fronds of some of the cultivated species are very fine.

Maid of Kent, name commonly applied to Elizabeth Barton, a religious enthusiast; abt. 1506-34; employed for some time as a servant in the village of Aldington, Kent. Left by illness in a state of partial derangement, she saw visions, and uttered delirious speeches which the superstition of the people invested with the sanctity of prophecies. Archbishop Warham, hearing of her alleged revelations, sent Edward Bocking, or Bocking, a canon of Canterbury, to investigate them. Whether persuaded of her divine mission or wishing to use her as a tool, Bocking encouraged her to continue prophesying. It was "revealed" to her that if Henry VIII obtained his divorce from Catharine he would come to a miserable end within seven months; the king's wrath soon made itself felt; she was arrested, and, after a public recantation and a confession that her visions were all "feigned of her imagination," was executed at Tyburn with Bocking and four others, 1534.

Maikop (mī'kōp), city of Kuban province; Caucasus, Russia; 63 m. SE. of Ekaterinodar; on Bielaya River; is a favorable point for the concentration of troops operating in the Caucasus, and is in a rich and fertile district. Pop. (1907) 34,327.

Maimonides (mī-mōn'ē-dēz), **Moses** (**MOSES BEN MAIMON**), 1135-1204; Jewish theologian and philosopher; b. Cordova, Spain; received from his father, Maimon, a theological and astronomical writer in Arabic, a superior education. In consequence of the religious persecution by the Almohades, he retired with his father to Fez, and subsequently proceeded to Egypt (1165), where he became physician to the court of Saladin. At the same time he was active as a rabbi, teacher, and writer in Arabic and Hebrew. His master works rapidly spread all over the Jewish world, inaugurating a period of literary and philosophical activity which is still regarded as the golden age of the Jews in exile. Of his numerous writings, which include treatises on

logic, medicine, mathematics, and astronomy, the most important are "The Copy of the Law," a general code of Jewish observances, written originally in Hebrew, and "The Guide of the Perplexed," a philosophy of Judaism.

Main (mān), river of Germany which rises in the Fichtelgebirge, flows with a tortuous course for a distance of 300 m., and joins the Rhine opposite Mainz; is navigable nearly 200 m., and is connected with the Danube by the Ludwig Canal; principal cities on its banks, Würzburg, Offenbach, and Frankfurt.

Maine, Sir Henry James Sumner, 1822-88; English jurist; was Regius Prof. of Civil Law at Cambridge, 1847-54; reader on jurisprudence at the Middle Temple, 1854-62; engaged in India on the great legislative reform, 1862-69; became Corpus Prof. of Jurisprudence at Oxford, 1870; entered the council of the Secretary of State for India, 1871; elected master of Trinity Hall, Cambridge, 1877; Prof. of International Law, 1887; wrote "Roman Law," "Ancient Law," "Early History of Institutions," "Early Law and Custom," "Popular Government," and "International Law."

Maine, ancient province of France, lying S. of Normandy, and comprising the present departments of Mayenne and Sarthe and parts of Eure and Orne.

Maine (name used by early explorers to designate the mainland as distinct from the islands which skirt the coast), popularly called the **PINE-TREE STATE** and **POLE-STAR STATE**; state flower, pine cone and tassel; state in the N. Atlantic division of the American union and largest of the New England states; bounded NW. by Quebec, N. by Quebec and New Bruns-



SEAL OF MAINE.

wick, E. by New Brunswick, SE. and S. by the Atlantic Ocean, W. by New Hampshire; extreme length, 302 m.; extreme width, 285 m.; area, 33,040 sq. m.; pop. (census of 1910) 742,371; capital, Augusta; principal cities and towns, Portland, Lewiston, Bangor, Biddeford, Auburn, Bath, Waterville, Rockland, Calais, Westbrook, Brunswick, South Portland, Saco, Oldtown, Gardiner, Eastport, Brewer, Belfast, Ellsworth, and Skowhegan.

The seacoast for 10 or 20 m. inland is flat,

low, and at some points marshy; exceptions are Mt. Agamenticus, in the SW., 670 ft. high; the Camden Hills, on the Penobscot, 1,500 ft., and the thirteen peaks of Mt. Desert Island and its vicinity, ranging from 1,000 to 2,800 ft. The Appalachian chain enters Maine from New Brunswick at Mars Hill and crosses it in a SW. direction, joining the White Mountain range at the New Hampshire line. It consists of isolated peaks, all trending SW., though often separated by broad river valleys and large streams. Mt. Katahdin, in the center of the state, is 5,385 ft. in height. Mt. Abraham, in Franklin Co., 3,400 ft. Two principal spurs or outliers from this range deserve notice—viz., the Ebene and Spencer Mountains, trending S. in Piscataquis Co., and the range of highlands along the Canada boundary, which rise to the height of 2,000 ft. at the Monument, and attain a higher altitude in Bald Mountain. Between these isolated summits the Penobscot and its principal tributary the Piscataquis, the Kennebec, and the Androscoggin flow toward the ocean. Other rivers are the Saco, Aroostook, St. Croix, and Walloostook, or St. John.

Following the line of the shores, Maine has 2,486 m. of seacoast, being the most irregular and deeply indented coastline in the U. S. There are seventeen large bays on the coast—viz., Passamaquoddy, Machias, Little Machias, Englishman's, Narraguagus, Frenchman's (protected by Mt. Desert Island), Isle au Haute, Penobscot and Belfast bays (forming together the fine estuary of the Penobscot River), Muscongus, Damariscotta, Sheepscott, Quohog, Casco, Saco, and Piscataqua Bay, or estuary. The area covered by the rivers and the many lakes is a little more than one eleventh of the total area. Moosehead Lake, the largest, is 35 m. long and 10 m. wide; Rangeley Lake is 1,511 ft. above sea level; numerous islands, many of them popular summer resorts, fringe the coast; largest, Mt. Desert, 100 sq. m. Climate, though severe and subject to great extremes, is moderately uniform during each season and favorable to health. Snow lies on the ground from three and a half to five months.

Soil, in the river valleys and between the Penobscot and the Kennebec and in the cultivated portions of Aristook Co., of good quality; in the mountainous districts and along the seacoast, sterile; alluvial soils on the Androscoggin, Sandy, and Kennebec excellent for cereals. Corn produced (1911), 792,000 bushels; oats, 5,198,000; other crops, barley, buckwheat, potatoes, and hay. Minerals of chief economic value, granite, limestone, and slate; others of value, mineral water, iron, copper, gold, silver, lead, zinc, tin, manganese, arsenic, antimony, pyrites, freestone, marble, quartz for glass, brick clay, feldspar, garnet, beryl, and tourmaline; total mineral output (1910) valued at \$4,713,123, including granite valued at \$2,315,730. According to the U. S. census of 1909, the state had 3,546 "factory-system" manufacturing plants, operated on a capital of \$202,260,000, and yielding products valued at \$176,029,000. The chief industries are quarrying, ship and boat building, fishing, lumbering (the extensive forests of pine, hemlock, spruce, fir, etc., being

a great source of wealth), the canning of lobsters, fish, vegetables, and fruits, and the manufacture of cottons and woollens, flour and grist mill products, lime, leather, paper, and wood-pulp, lumber and timber products, farm implements, ships, furniture, boots and shoes, spars, and cordage. Maine has twelve U. S. customs districts and ports of entry—Aroostook, Bangor, Bath, Belfast, Castine, Frenchman Bay, Kennebunk, Machias, Passamaquoddy, Portland and Falmouth, Waldoboro and Wicasset. Tonnage of vessels in the foreign trade entering in year ending June 30, 1911, 721,333; clearing, 717,778; value of imports of domestic and foreign merchandise, \$5,833,023; exports, \$8,483,692.

Maine was probably visited by the Northmen abt. 1000 A.D. Settlements by the French on an island in the St. Croix River, 1604, and by Englishmen under George Popham and Gilbert Raleigh at the mouth of the Kennebec, 1607, were soon abandoned. In 1622 Sir Ferdinando Gorges and Capt. John Mason were granted the country between the Merrimac and the Kennebec for 60 m. inland. The first permanent settlement by Europeans was at Monhegan, 1622. By a division, 1629, Gorges received the portion between the Piscataqua and the Kennebec. In 1635 Sir William Alexander, Earl of Stirling, received the region between the Kennebec and the St. Croix. Gorges, 1639, had his territory extended, and was invested with viceregal powers over the province of Maine. In 1641 he established his government under a kinsman at Gorgiana, now York, which, 1642, became the first chartered city in America. Meanwhile, 1635, the French had expelled the English from the Penobscot region. In 1677 Massachusetts purchased the interest of the grandson of Gorges, and in 1699 the charter of William and Mary included Maine in the province of Massachusetts Bay. In 1820 Maine became a separate state. Soon after the treaty of 1783 with Great Britain there arose a dispute about the NE. boundary of Maine, which was carried on with increasing bitterness until, 1842, the boundary was settled by the Ashburton Treaty. At this time Maine lost 5,500 sq. m. of territory.

In 1851 the first effective prohibitory liquor law was passed; 1884, prohibition was embodied in the constitution of the state.

Mai'notes, people of Maina, a mountain district of Laconia, in the Peloponnesus, between the Messenian and Laconian gulfs, so called since the reign of Constantine Porphyrogenetus, 944-59 A.D. They boast of their descent from the ancient Spartans, although some consider them Slavic. They remained pagan until the reign of Basil, 867-86 A.D. They were virtually independent for many years before the rest of modern Greece. They are handsome, warlike, superstitious, and were formerly notorious robbers. Their number is abt. 60,000.

Maintenon (mān-tè-nōn'), *Françoise d'Aubigné* (Marquise de), 1635-1719; second wife of Louis XIV; b. in prison in Niort, France; went, 1639, with her parents to Martinique, her father not being allowed to remain in France on account of his alleged treason; returned, 1646; was sent by her relatives to be

educated at an Ursuline convent; under its influences became a Roman Catholic; was, 1651-60, the wife of the poet Scarron; and, 1669, became governess to Louis XIV's children by Madame Montespan, whom she supplanted in the king's affections. She acquired and long maintained a powerful influence over the king, but it is believed that she was never his mistress. In 1685 the king married her in private. She procured the Revocation of the Edict of Nantes and displayed great zeal for the Roman Catholic Church. She had considerable literary talent, and her "Letters" are valuable.

Mainz (mînts), French, **MAYENCE**, city of Germany and a fortress of the first rank; in Hesse; on the Rhine, nearly opposite the influx of the Main. It is surrounded on all sides by a system of strong fortifications consisting of fourteen immense bastions and four detached forts, which command both sides of the Rhine. It contains many interesting buildings, among which is the cathedral, of the fourteenth century, and many beautiful promenades and public places, such as the Gutenberg Palace, with the magnificent bronze monument of Johann Gutenberg, who was born and died here. Among its manufactures those of carriages, furniture, and musical instruments have great repute, and its trade is very considerable. Mainz was founded in the second century by the Romans and destroyed in the fifth by Attila, but was restored by Charlemagne. It soon became the see of an archbishop, and in course of time the archbishop became one of the three ecclesiastical electors of the empire. During the Thirty Years' War it was taken by the Swedes, was again captured by the imperialists, 1635, and by the French, 1644. Pop. (1905) 91,179.

Maisonnewe (mă-zōn-név'), **Paul de Chomedey** (Sieur de), d. 1676; first Governor of Montreal, Canada; b. in France; reached Quebec, 1641, at the head of a body of colonists; went to Montreal, and was installed as governor. His administration was very able, but he was removed, 1664, by De Mesy, the governor general, and sent back to France, 1665, though no charges were made against him.

Maistre (mătr), **Joseph** (Comte de), 1754-1821; Italian statesman; b. Chambery, Savoy, then in Sardinia; son of the President of the Senate of Savoy, and himself became a Senator, 1787; entered the service of the King of Piedmont; was Grand Chancellor of Sardinia, 1799; Minister to Russia, 1803-17; Regent of the Grand Chancery, 1818; became a member of the Turin Academy, 1819. He was the most powerful defender of ultramontaniam, the divine right of kings, and the papal infallibility, and advocated with marked ability a return to the mediæval system. The politics and thought of his own and subsequent times were much influenced by his writings.

Maize, or **In'dian Corn**, most important grain raised in N. America; belonging to the tribe *Phalarida* of the natural order *Gramineæ*, or grasses. Its scientific name is *Zea mays*. It is indigenous to America, where it has always formed the chief food of the Indian races, and from this circumstance its common name is de-

rived. Its cultivation was introduced from America into S. Europe and Asia, and into N. Africa, where it spread with rapidity. Indian corn properly is a subtropical grain, probably a native of the table-lands of Mexico or Peru, the great height of which gives them a distinct character from the lowlands in the same latitude. It thrives best under a hot summer sun, and its rapid growth and ripening give it a



MAIZE.

peculiar value for high N. latitudes, where the summer heat is as intense as the winter cold. In Great Britain the summer heat is not sufficiently intense to favor its production, and maize is very little grown in any part of Europe. Not only does maize require a high summer temperature, but it is a rapid and gross feeder and needs a large amount of moisture; it therefore flourishes best in a loose, fertile, well-cultivated, thoroughly drained soil, for though it requires a large amount of water in its growth, it will not thrive in a heavy, sodden, wet soil. It is grown both for its grain and the forage in its leaves and stalks. The grain is used for human consumption and as a food for animals. Large quantities of the grain are also used to make distilled liquors, starch, and glucose sugar.

The maize plant is an extremely variable one, and during its long period of cultivation it has developed many varieties, which can be classified into five groups or races, as follows: Soft corn, popcorn, sweet corn, flint corn, and dent corn. The distinction between the races is founded mainly on the difference in the proportion of the corneous and starchy portions of the kernels. In one race the whole interior of the kernel is made up of starchy matter, to the exclusion of the corneous. This race is called soft corn. In popcorn the whole of the kernel is made up of corneous material, with little or no starchy material. The peculiar quality of this class of varieties is that when heated rather quickly the kernel explodes with force, and the corneous matter becomes expanded into a white, floury mass. The sweet corns also have a kernel largely made up of corneous matter, but when dry they present a much shrunken and wrinkled appearance. In flint corn the corneous

portion makes up from one half to two thirds of the whole bulk of the kernel, enveloping on the outside the starchy material. Dent corn differs from flint corn in that at the top of the kernel there is a characteristic depression, and the starchy material reaches to the outside. Flint corn and dent corn are the two kinds most grown for market.

In recent years corn has become the most valuable agricultural product of the U. S., and is grown in every state and territory except Nevada. Official reports for 1911, adjusted to census basis, show total corn acreage, 105,825,000; production, 2,531,488,000 bushels; farm value, \$1,565,258,000. The chief corn states, with production, were: Illinois, 334,950,000 bushels; Iowa, 305,350,000; Missouri, 192,400,000; Indiana, 174,600,000; Nebraska, 155,925,000; Ohio, 150,540,000; Kansas, 126,150,000; Kentucky, 93,600,000, and Tennessee, 91,120,000—all others being under 75,000,000. The total number of bushels produced in the world in 1910 was 4,026,967,000.

Maj'esty, title which, as applied to royalty, is a reminiscence of the *majestas* claimed by the Roman emperors—a peculiar dignity, or literally greatness, which was held to have directly descended to the emperors of Germany. Henry VIII was the first English king to assume the style of His Majesty. The French kings after Louis XI were by papal bull authorized to take the title of Most Christian Majesty; those of Spain, Most Catholic Majesty; the Kings of Hungary, His Apostolic Majesty; the Kings of Portugal, Most Faithful Majesty. The monarch of Austria-Hungary was called His Imperial Royal Majesty; of Germany, His Majesty the Emperor and King.

Majol'ica, or **Maiolica** (mā-yō'li-kā), enameled earthenware decorated in colors, and made in Italy. It is falence, that is, it has a coarse earthenware body and an opaque smooth enamel, which covers and conceals the body, and on which the painting is applied. In Italy the term is applied to all such wares, or to all except the coarsest and plainest; but it is used by collectors and students of ceramic art in two special senses: first, by some writers for those wares which are decorated with metallic luster, and for those only; second, for all the richly decorated wares of the fifteenth and sixteenth centuries, and since that time, of which the lustered wares are only a portion. This last is the sense in which the word is most commonly used in English. Della Robbia ware is not classed among majolica, because it has a far more solid and hard body. Some modern English wares of hard terra cotta, covered with colored opaque or partially opaque glazes, are called *majolica*, in which case the term is rather a trade name.

The term *mezza-majolica*, that is, half or halfway majolica, is applied to certain Italian wares of less beauty and importance than the fine pieces, and especially to those which are covered, not with real tin glaze, but with *slip*, or potter's clay made very thin and liquid, or in some cases with lead glaze. The towns in which the famous and beautiful majolica was made are situated in the NE. of Italy, with

few exceptions. The most famous are: Faenza, near Ravenna; Urbino, Pesaro, Gubbio, and Castel Durante (now Urbania); Caffagiolo, in Tuscany; Deruta near Perugia. Castelli, in the Abruzzi, is remarkable for having kept its fine work going to a much later date than the N. towns.

Ma'jor, in music, any mode, interval, or key which is in certain respects *greater* than others. The major mode is that in which the third above the tonic or keynote is major, as from C to E, G to B, or D to F. This interval of a major third embraces four semitones, whereas in a minor third there are only three. From this arises the distinction of greater and lesser, *i.e.*, major and minor. The major intervals always contain one semitone more than the minor. See **MINOR**.

Major'ca, island of the Mediterranean, belonging to Spain, and forming the largest of the Balearic group; area, 1,310 sq. m. The N. part is mountainous, Silla de Torellas rising 4,596 ft.; the S. and W. parts are lower, and afford several good harbors. The soil is very fertile, and the climate a perpetual spring. All the products of S. Spain, more especially of the province of Valencia, are raised here to perfection. Pop. (1900) 251,920.

Makart', Hans, 1840-84; Austrian painter; b. Salzburg; studied in Vienna and Munich; began to exhibit, 1866; visited Italy, 1869; and lived for some time in Rome; afterwards in Budapest and Vienna. His principal pictures are "Leda and the Swan," "The Plague in Florence," "The Seven Deadly Sins," "Tannhäuser," "The Entrée of Charles V into Antwerp," etc. The last-mentioned picture became, through photographs and engravings, exceedingly popular.

Malabar', district of British India; province of Madras; extending along the Arabian Sea; comprising an area of 5,765 sq. m., with a population of 2,500,000; capital, Calicut. The principal products are timber, especially teak, and pepper.

Malac'ca, old geographical name still used occasionally for the Malay Peninsula.

Also a small territory on the W. coast of the Malay Peninsula and its capital; a part of the British Straits Settlements, formerly a part of the confederation of Negri-Sembilan, 100 to 150 m. NW. of Singapore; area, 640 sq. m. Pop. (1901) 91,000. Pop. of town abt. 20,000.

Malacca Cane, or **Cloud'ed Cane**, stem of a Malayan palm, larger than rattan and of a mottled brown color. Its lightness and rich color make it popular for walking sticks.

Malacca, Strait of, channel which separates the Malay Peninsula from the Island of Sumatra; is 500 m. in length; breadth, 35 to 180 m.

Malachi (māl'ā-ki), last of the minor prophets. Nothing is known of his person or history, and some hold that Ezra was the writer of what is called the Book of Malachi. The

prophet, who was contemporary with Nehemiah, 446 B.C., complains of the irreligiousness of the priests and the people, and announces the coming of the Lord Himself to judgment.

Malachite (māl'ā-kīt), native carbonate of copper, sometimes crystallized, but oftener occurring in concretionary masses, of various shades of green, generally in bands or curved figures. Of the latter variety, used as an ornamental stone, large quantities are found in the Siberian mines, and many beautiful articles are made from it.

Mal'aga, capital of province of Malaga, Spain; on the Mediterranean; 65 m. N.E. of Gibraltar; at the foot of a lofty mountain range, whose highest peak is crowned with the old Moorish castle Gibralfaro, and whose undulating sides are covered with vines producing the famous Malaga wine. It is an old city, founded by the Carthaginians. It has a cathedral, two fine theaters, and an immense amphitheater for bull fights. Its trade in wine, oil, figs, almonds, raisins, and grapes is extensive, and its manufactures of cloth, silk, ropes, and leather are prosperous; besides, it has several large iron foundries, breweries, and distilleries. Pop. (1900) 130,100.

Mal'ar, most beautiful and one of the largest lakes of Sweden; with breadth of from 2 to 20 m., it stretches 70 m. inland from the Baltic Sea, with which it is connected by a small but deep channel. It contains over 1,260 islands, fertile and well cultivated, or covered with forests of pine and birch. Stockholm is situated on both sides of the channel and on a number of islands in the lake.

Mala'ria, or **Mias'ma**, that element in the cause of diseases peculiar to certain locations (usually marshy) which is found in the air of such places, and which is known only by the effects of its operation. The term is said to have been used, with a signification similar to that which it has to-day, as long ago as the time of Hippocrates, who, in his treatise "On Airs," attributes various diseases to a mixture of the blood with vitiated air. The word miasma has had somewhat different significations at different times; thus it has been used to indicate injurious emanations from the soil or from dead or living vegetable or animal organisms, being synonymous with effluvia. Again, it has been applied (especially in Paris) to the influence on health of persons afflicted with infectious diseases. Laveran first advanced the idea that there is always present in the blood of patients with malarial fever a peculiar organism (hematozoön) not found in any other disease. This organism, which is regarded as a parasite, has been carefully studied by Prof. Osler and Prof. Councilman, of Johns Hopkins Univ., and Prof. Dock, of the Univ. of Michigan. The different forms and phases of malarial fever are (according to this theory) associated with various forms and stages of development of the organism which is sometimes called the *Plasmodium malariae Laveran*.

These germs are found in the blood cells, and also free in the blood fluid. They are seen

to have very different shapes, but all the shapes are quite characteristic. The most striking forms are globular masses containing pigment granules, and those of a fairly round shape, with or without one or more flagella. In some cases they are seen to have a body depressed on one side like a saucer, presenting, when seen on edge, the appearance of a crescent. Laveran prefers to call his germ a *hematozoaire*. Most interesting in this connection are the recent investigations of the bite of the mosquito *Anopheles*. The fact that malarial fevers occur very frequently in the neighborhood of marshy regions has led to the use of such terms as "marsh miasm" and "paludal fever"; but malarial fevers are by no means confined to moist ground. Still miasma, or malaria, is in general most active in the neighborhood of moist ground in which decaying, vegetable matter is present. It is also often liberated from soil which has long been undisturbed, as when canals are made or streets are dug up. That which is typical of miasmatic or malarial fevers giving rise to the name intermittent fever, is the regular repetition of a series of the following phenomena: a chill, a rise of temperature, a sweat, and a period of comparative freedom from any of these symptoms. Besides these, disturbances of the digestive apparatus of varying degrees of severity and diarrhea, as well as nervous disorders, dysentery, etc., are attributed by medical writers to the same agency.

Malay' Archipel'ago, those islands which lie in the N.E. part of the Indian Ocean; area about 650,000 sq. m.; pop. est. 23,000,000; divided into three groups: first, the Molucca Islands, the Spice Islands, Banda, Amboina, Ternate, and the Philippines; second, Sumatra, Java, and the small Sunda Islands E. of Java, from Bali to Timorlaut; third, Borneo and Celebes, with a large number of smaller islands, as Billiton, Banca, Singapore, etc. The Dutch have become masters of the greatest number of islands; the U. S. has the Philippines; the Portuguese have Dilli and part of Timor; and the British, Singapore, Labuan, and N. Borneo.

Malay Penin'sula, peninsula extending S. from Indo China; begins properly about the latitude of Bangkok; name is usually applied only to the peninsula beyond the Isthmus of Kra; ends in Cape Roumania; thus limited, it is about 850 m. long, 210 m. broad at its broadest part, contains an area of 82,000 sq. m., and a population of 1,400,000. Politically, the territory is divided among the Siamese tributary states, the Straits Settlements (British), and the states protected by the British.

The human races represented are: (1) The Negritos, existing in small numbers in the mountains; (2) the Siamese, especially N. of the parallel of 7° N.; (3) the civilized Malays, occupying the territory S. of 7° N., except the mountains of the interior, and savage tribes of Malays found in the latter localities with the Negritos; (4) among the immigrants the Chinese occupy the first place, then come in order the Hindus, Arabs, Armenians, Jews, and Europeans.

Malay Race (called by themselves **MALAYU**), the dominant race of Malacca (the Malay Peninsula) and the E. Indian Islands (Malay Archipelago). In a larger sense, the inhabitants of the greater part of the islands of Polynesia are said to be of Malay race, since physically and in language they are kindred, and the Malay traditions assume an insular origin for their people. Some ethnologists have made the Malays the type of a fifth or brown race of mankind, but others regard them as essentially Mongolian. They are of a brown color, have black and often curled hair, and prominent facial bones, are short of stature, and as a rule courageous, but unstable and subject to fits of uncontrollable rage. They are treacherous and unforgiving enemies and inconstant friends, idle and revengeful, but are active and useful sailors. Gambling, cock fighting, and intoxication are the national vices. The Malays are inveterate liars. Some observers, however, give the Malays a much better character than the one here drawn. It is probable that intercourse with unscrupulous Europeans and Chinese has degraded them, as it has most other rude peoples, and the injustice and cheating of traders have done much to make them treacherous and deceitful. Fortunately, the Malays have a patriarchal system of living which has prevented them becoming an aggressive and far-conquering race. In religion they are Mohammedans. Fondness for music and disregard of death are almost universal. Their so-called civilization is small. There are manufactures of weapons, of ornamental gold and filigree work, and of fast-sailing but small vessels of peculiar construction. The people are largely engaged in agriculture and trade. The standard Malay language, which belongs to the Malayo-Polynesian family, is written in the Arabic character. It is the commercial language of the East, and has been called, for its euphony, the Italian of Asia. The literature is abundant, and bears strong marks of Sanskrit and Arabian influence.

Mal'colm (māl'kūm), the name of four kings of Scotland. **MALCOLM I**, d. 954; son of Donald IV; succeeded Constantine III, 943; received Cumbria from the Anglo-Saxon king Edmund; killed in revolt in N. of Scotland. **MALCOLM II**, d. 1034; son of Kenneth III; succeeded 1005, successfully resisted the attempts of the Danes to conquer Scotland, and secured possession of Lothian. **MALCOLM III** (surnamed **CANMORE**), d. 1093; son of Duncan I; succeeded, 1054, on the murder of his father by Macbeth; gained victory at Lumphanan, where Macbeth was killed; supported the cause of Edgar Atheling, Anglo-Saxon claimant to the throne of England, whose sister he had married; after unsuccessful invasion of England was forced to acknowledge William the Conqueror as his suzerain; made second invasion and was killed near Alnwick. **MALCOLM IV** (surnamed **THE MAIDEN**), 1141-65; King of Scotland; son of Henry; succeeded his grandfather, David I, 1153; contended with many insurrections; made peace with Henry II of England by ceding Northumberland to him, 1157; suppressed a second rebellion of Som-

led, Lord of the Isles; succeeded by his brother William.

Malcolm, Sir John, 1769-1833; British diplomatist; b. Burnfoot, Scotland; early received a cadetship in India; held civil and military offices; and performed important diplomatic services in Persia and India. He went to England, 1812, and published "History of Persia," written from original Persian annals. On returning to India, 1817, he was appointed political agent in the Deccan. He was second in command during the Mahratta and Pindaree wars, and distinguished himself at Mehidpur, where Holkar was routed. Subsequently, as Governor of Malwa and the adjoining provinces, he rescued those territories from anarchy and brigandage. Other works, "A Memoir of Central India," "Sketch of the Political History of India from 1784 to 1823," and a life of Clive.

Mal'den, city in Middlesex, Mass.; on the Malden River; 4 m. N. of Boston; is noted for its manufactures, which include rubber boots and shoes, leather goods, carpets and rugs, cotton goods, sand and emery paper, and boot and shoe lasts; contains Converse Memorial Hall, Bazar, Ladies', Public and High School libraries, Art Gallery, and U. S. niter storehouse. Pop. (1910) 44,404.

Maldiv (māl'div) **Is'lands**, larger part of a remarkable line of coral islands extending from off the Malabar coast S. for 20° of latitude, and consisting of the Laccadives, Minikoi, the Maldives, and the Chagos Archipelago. The Maldives form a double series of large atolls (nineteen in number), arranged like a closed chain hung on a peg. The total number of islets is estimated at 12,000; 200 are inhabited; pop. est. at 30,000. The larger islands are covered with wood, the cocoa palm being the characteristic tree. The people are like the Singhalese, and speak a Singhalese dialect, but they have some characteristics in common with the people of Malabar, and also betray some African intermixture. They were converted to Islam abt. 1200 A.D. They have since been in Portuguese, French, and Dutch hands, and now form a nominal dependency of Ceylon.

Malebranche (mäl-brāñsh'), Nicolas, 1638-1715; French philosopher; b. Paris; entered the Congregation of the Oratory, 1660; published, 1674, "The Search for Truth," intended to demonstrate the harmony of the Cartesian philosophy with revealed religion, and developing his famous principle that "we see all things in God." His other works include "Conversations on Metaphysics and Religion," "Treatise on Morality," "Conversations of a Christian Philosopher and a Chinese Philosopher on the Existence of God."

Malesherbes (mäl-zärb'), Chrétien Guillaume de Lamoignon, 1721-94; French statesman; b. Paris; occupied with great honor the most responsible positions in the civil service; censor of the press and president of the Court of Aids, 1760-71; was banished by Louis XV, 1771, for protesting against the imposition of

new taxes; recalled by Louis XVI, 1774, and was Minister of the Interior in the Cabinet of Turgot, resigning when the latter was dismissed, 1776. When, 1792, Louis XVI was arraigned before the National Convention he undertook his defense, the immediate result of which was his own arraignment, 1793. In April, 1794, he was guillotined.

Mal'et, Sir Edward Baldwin, 1837-1908; English diplomatist; b. The Hague, Holland; appointed *attaché* at Frankfort, 1854; afterwards was in the diplomatic service in the Argentine Confederation, and at Washington, Paris, Pekin, Athens, and Rome; appointed minister at Constantinople, 1878; agent consul general and minister to Egypt, 1879; and was ambassador to Germany, 1884-95; published "Foundation of an English Libretto for the Opera of Harold."

Malherbe (mäl-ärb'), François de, 1555-1628; French poet and critic; b. Caen; obtained the favor of Henry III and of Marie de Médicis by flattering poems; in 1605 was given a position at court by Henry IV, whose poetical commissions he executed. During the rest of his life he continued to be a court poet and came to be the great authority in the world of letters. He published a few translations from the Latin and a volume of verse. He gave a polish and grace to the lyric poetry of France, made the French of Paris the standard, and was the real inaugurator of French classicism.

Malheur (mäl-hér') River, river which rises by several head streams in the SE. part of Oregon; flows in a NE. direction, and empties into the Snake River, on the boundary between Oregon and Idaho.

Malibran (mä-lë-brän'), Maria Felicità, 1808-36; French opera singer; b. Paris; daughter of Manuel Garcia; made her début, 1825, as *Rosina* in "The Barber of Seville" in London; visited in the same year the U. S.; married, 1828, M. Malibran, a French banker of New York. After he had become a bankrupt she separated from him. She appeared in Paris, 1828, as *Semiramis*; sang for several years alternately in London and Paris, with occasional excursions to Italy and Belgium; married, 1836, the famous violinist De Bériot. Her voice, a mezzo-soprano, was developed to perfection, and to these advantages was added a considerable dramatic talent.

Malin'gering. See FEIGNED DISEASES.

Mal'lard, or Green'head, very common wild duck in N. America and Europe; known to science as *Anas boschas*; is the original from which have sprung almost all the varieties of the domestic duck, excepting some which are bred in China and Japan. The male is nearly 2 ft. long, and has a grass-green neck and head, with a tint of violet; a white ring around the neck, brownish chestnut below. The female is smaller, and her plumage is plain brown.

Mallarmé (mä-lär-mä'), Stéphane, 1842-98; French poet; b. Paris; was a teacher of English in the Lycée Fontanes; became a leader

of the innovating group of writers—the so-called "Décadents." His works include "L'Après-Midi d'un faune," "Les Dieux antiques," "Nouvelle mythologie," Beckford's "Vathek," with an incomprehensible preface; "Poésies," "Poèmes d'Edgar Poe" (translation).

Mal'tery, Garrick, 1831-94; American ethnologist; b. Wilkes-Barre, Pa.; admitted to the bar in Philadelphia, 1853; practiced till the Civil War, in which he served in the Union volunteer army; afterwards entered the regular army; became acting chief signal officer; accompanied Powell's Rocky Mountain surveying expedition; and was made chief of the U. S. Bureau of Ethnology, 1879. His most important works include "A Calendar of the Dakota Nation," "Introduction to the Study of Sign Language Among the North American Indians as Illustrating the Gesture Speech of Mankind," "A Collection of Gesture Signs and Signals of the North American Indians, with Some Comparisons," "Sign Language Among North American Indians Compared with That Among Other Peoples and Deaf-mutes," "Pictographs of the North American Indians," "Israelite and Indian: a Parallel in Planes of Culture," "Greeting by Gesture," "Picture Writing of the American Indians."

Mal'low Fam'ly, family of dicotyledonous plants, mostly herbs or shrubs (rarely trees), consisting of about 800 species, which are widely distributed, but most abundant in hot climates. There are about 125 native species in the U. S. Some mallows (*Malva*) are grown



WILD MALLOW.

for ornamental purposes, as are also the rose mallow (*Hibiscus*), hollyhock (*Althæa*), *Callirhoe*, etc. Okra, a species of *Hibiscus*, produces edible pods. By far the most important plants of the family are those which produce cotton, which consists of the long hairs attached to the seeds of *Gossypium*, natives of the warmer portions of the Old World. The common cotton of cultivation, especially in the S. U. S., is *G. herbaceum*.

Mal'mö, city in Sweden; on the Sound opposite Copenhagen; is surrounded by a canal, outside of which are two suburbs. The chief industries are shipbuilding and the manufacture of stockings, gloves, soap, and tobacco. It has an extensive trade with Copenhagen and the Baltic ports. The city gave its name to an armistice formed there between Prussia and Denmark, 1848, suspending hostilities for an interval of seven months. Pop. (1907) 79,817.

Malmsey (mām'zī), originally a sweet white or red wine from Monembasia (or Napoli di Malvasia). The name afterwards came to be applied to other sweet Levantine wines, and still later to any other very sweet wines. It is at present applied especially to "malmsey madeira," which is much weaker than standard madeira wine.

Malmström (mäl'm'strēm), **Bernhard Elis**, 1816-65; Swedish poet; b. Nerike; became Prof. of Æsthetics and History of Literature in the Univ. of Upsala; gained, 1840, the grand prize of the Swedish Academy for the elegy "Angelika," published the epos "Ariadne," the dramatized poem "Julianus," the idyl "The Fisherman's Daughter"; also, "Studies in the History of Literature" and "Speeches and Æsthetic Essays."

Malone, **Edmond**, 1741-1812; Irish Shakespearean scholar; b. Dublin; called to the bar, 1767; devoted himself to literary pursuits in London; edited the works of Sir Joshua Reynolds, of Dryden, and of W. G. Hamilton, in each instance accompanied by a memoir, and published a "History of the English Stage," but is chiefly known by his exposure of Samuel Ireland's Shakespearean forgeries, 1796, and by his critical editions of Shakespeare.

Mal'ory, **Sir Thomas**, abt. 1430-after 1470; English prose writer; is thought to have been a native of Warwickshire; wrote "Morte d'Arthur," a prose compendium of the romantic material concerning King Arthur and the Knights of the Round Table, published 1485. This work has exercised a powerful influence on English literature, and was a main source for Tennyson's "Idylls of the King."

Malpighi (mäl-pē'gē), **Marcello**, 1628-94; Italian anatomist; b. Crevalcuore, near Bologna; held the chair of medicine successively at Pisa, Messina, and Bologna; was called to Rome, 1691, by Innocent XII as his chief physician; was the first to apply the newly invented microscope in the study of anatomy. His principal discovery was that of the transition of the blood from the arteries to the veins.

Malplaquet (mäl-plä-kä'), village in department of Le Nord, France; 10 m. S. of Mons, Belgium; famous for the battle which took place here, September 11, 1709, between the French under Villars and the allied British, Dutch, and Austrians under Marlborough and Eugene, resulting in favor of the allies and in the capture of Mons. Pop. (1900) 3,916.

Malström. See MAELSTRÖM.

Malt, barley which has been allowed to pass through the earlier stages of germination, and

then dried to destroy its vitality and prevent further change.

Mal'ta, island in the Mediterranean, belonging to Great Britain; 58 m. from Sicily and 180 from Africa; is the principal island of the Maltese group, which, besides Malta, comprises Gozo, Comino, Cominotto, and Tilfa; area of the group, 117 sq. m.; of Malta, 95; pop. (1908) 209,974; capital, Valetta. The surface is elevated and rocky, but produces wheat, cotton, figs, oranges, and grapes in abundance. Many potatoes are raised for the English market. The climate is hot, but healthful. The island is chiefly important as a station on the route from Great Britain, via Egypt, to India. Malta was known to the Greeks under the name of Ogygia. The Phœnicians and Carthaginians colonized the island in turn, but it became a Roman possession. In 56 A.D. St. Paul was shipwrecked here. After the fall of the E. Roman Empire the island was conquered by the Vandals, 454; the Goths, 494; the Byzantines, 533; the Arabs, 870, and the Normans, 1090, who united it to Sicily. In 1530 Charles V. gave it to the Knights of the Order of St. John of Jerusalem, driven by the Turks from Rhodes. In 1798 Bonaparte took the island by treachery. In 1800 it was taken by the British.

Malte-Brun (mält-brūn'), rightly **MALTHE CONRAD BRUNN**, 1775-1826; Danish-French geographer; b. Thisted, Jutland; became the favorite in all literary circles in Copenhagen; by advocating the principles of the French Revolution and by attacking the state of affairs in Denmark, came into disfavor with the government, and was exiled. He settled in Paris, 1796; became an adopted citizen, 1800; for some years was joint editor of the *Journal des Débats*. With Mentelle he published "Mathematical, Physical, and Political Geography"; established, 1808, the periodical *Annals of Voyages of Geography and of History*, and published "System of Universal Geography."

Mal'tha, word first used by Pliny and applied by him to what he called an inflammable mud from the Euphrates. In modern times the word has been used to designate those forms of bitumen that resemble tar in consistence, and hence are sometimes called mineral tar. It appears to be the product of the gradual metamorphosis of certain forms of petroleum under the influence of atmospheric oxygen, by which the bitumen becomes richer in carbon. It is a black, viscous fluid, of a specific gravity between .9 and 1, and usually contains in mechanical admixture ten to twelve per cent of water and air. It issues from springs with water and floats on pools of water. It consists chemically of a very complex mixture of compounds of carbon and hydrogen, often with oxygen and nitrogen in addition. These substances dissolve each other.

Mal'thus, **Thomas Robert**, 1766-1834; English political economist; b. Albany, Surrey; admitted to holy orders and took a small parish in Surrey, 1797; Prof. of History and Political Economy in the E. India College, Haileybury, 1805-34. Author of "Essay on the Principles of Population, or a View of Its Past and Pres-

ent Effects on Human Happiness," whose leading idea is that, in order to avoid the evils of a population in excess of support, some checks must be applied to the increase of population; "Observations on the Effects of the Corn Laws," "Principles of Political Economy," "Definitions in Political Economy."

Malus (mă-lûs'), Étienne Louis, 1775-1812; French military engineer; b. Paris; was employed in the reconstruction of the fortifications of Antwerp and Kehl; became examiner at the École Polytechnique, 1811. He was the discoverer of the polarization of light by reflection, and his memoir on the subject received a prize from the Academy.

Mal'vern Hill, Bat'tle of, engagement during the Civil War in the U. S.; the last of the "Seven Days' Fight," July 1, 1862; occurred on the James River, about 15 m. SE. of Richmond. Here, about 5.30 p.m., the left and center of McClellan's army, under Morrell and Couch, were attacked by Jackson and D. H. Hill, supported by Magruder, of Lee's army. The Confederates were repulsed, their losses being more than double those of the Federals. Instead of taking advantage of this success, McClellan retired to Harrison's Landing, while the Confederates, after holding their lines for several days, retired to Richmond.

Mameluco (măm-ê-lû'kô), Portuguese word, originally the same as the English Mameluke; applied in Brazil to the offspring of a negro and an Indian. In the seventeenth and eighteenth centuries the Jesuits of Paraguay gave this name in an especial manner to the slave hunters of São Paulo who raided their missions, and who were generally of mixed race. The so-called Republic of the Mamelucos, described by Jesuit authors, never had any real existence.

Mam'elukes, former class of slaves in Egypt who became and long remained the dominant people of that country. Early in the thirteenth century the Sultan of Egypt bought of Genghis Khan 12,000 slaves, mostly Tartars and Turks. In 1242 Malek-el-Saleh made some of them his bodyguard. In 1250 this bodyguard killed his successor, Turan Shah, seized Egypt, and chose for their sovereign not a man, but the Sultana Chagereh-ed-Dorr. She married Ibeg Izzeddin, who founded the Baharite or Tartar-Mameluke dynasty, in its turn overthrown by Circassian slaves, 1382. The new Circassian-Mameluke dynasty reigned till 1517, when Egypt was subdued by Sultan Selim I. The Mamelukes recovered gradually their former power, but were almost destroyed by Bonaparte at the battle of the Pyramids, 1798. On the evacuation of Egypt by the French they again assumed control, but were treacherously massacred by Mehemet Ali, 1811. The few survivors, escaping to New Dongola, were practically exterminated, 1820.

Mamiani (mă-mê-â'nê), Terenzio (Count), 1800-85; Italian philosophical writer and educator; b. Pesaro; became, 1831, a member of the revolutionary provisional government of Bologna; was afterwards proscribed and imprisoned in Venice; became Minister of the In-

terior; appointed by Pius IX, 1848, and subsequently for a time Minister of Foreign Affairs; was elected to the Roman Constituent Assembly. On the arrival of the French he retired to Genoa, where he founded the *Accademia di Filosofia Italiana*. He was successively a Deputy to Parliament, Senator, Minister of Public Instruction, and at the same time Prof. of Philosophy and of History at the Univ. of Turin; Minister to Greece and to Switzerland, President of the Superior Council of Public Instruction, in Rome. His works include a volume of poems; "Revival of the Ancient Italian Philosophy," "The Confession of a Metaphysician," "The Psychology of Kant," "Social Questions."

Mam'mals (from Latin *mammalis*, pertaining to or having breasts; deriv. of *mam'ma*, breast, pap, teat), the highest class of the vertebrate branch of the animal kingdom, and therefore the most specialized or highest group of living creatures. The class includes all vertebrates with warm blood, a heart of four chambers, the lower jaw composed of two branches articulated directly with the skull, and the body partly or wholly covered with hair. They suckle their young. It thus includes man, all the hairy quadrupeds, and the various whale and porpoise-like animals which possess hair only in the embryonic state and often then only on the upper lip. The habit of bringing forth the young alive is not exclusively a character of the mammals, being shared by various reptiles and fishes. On the other hand, the very lowest of the mammals, the Monotremes, such as the duckbill, lay eggs similar to those of the snakes, and the *mammæ* or milk glands of the female are scarcely differentiated. The mammals are divided into eleven orders:

Monotremes, represented by the duck-mole.
Marsupials, including kangaroos and opossums, whose young are carried by the female in a pouch of skin on the under side of the body.
Rodents or gnawers (Glives), including rats, mice, squirrels, gophers, and rabbits.
Insectivores, or insect-eating mammals, as shrews and moles.
Bats (chiropters), also insect-eaters, but differing in structure from the shrews and moles.
Cetacea, whales, porpoises, and dolphins, externally resembling fishes.
Ungulata, or hoofed mammals, including elephant, deer, horse, sheep, cattle, etc.
Carnivora, or flesh-eating mammals, as lions, bears, dogs, cats, etc.
Primates, or manlike mammals, including the lemurs, monkeys, and man.

Mammals exist in almost every region of the globe, but were wanting, previous to their introduction by man, in the Polynesian Islands, as well as in New Zealand. Monotremes are peculiar to Australasia. Marsupials are now confined to Australasia and outlying islands and America; in the former numerous types being represented, and in the latter but one—the opossums. Insectivores are wanting in the regions where marsupials abound, but are well represented in the entire N. hemisphere, as well as in Asia and Africa. Primates are represented especially in the tropical regions of Africa, Asia, and America, but in very different forms, the lowest type, lemurs, being now pe-

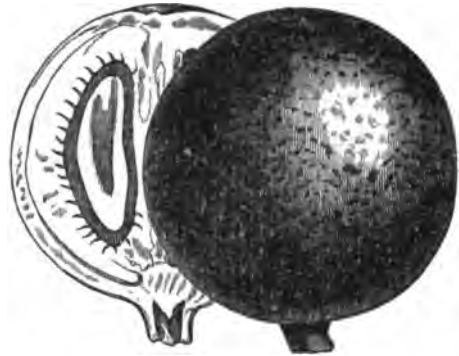
cular to the Old World and best developed in Madagascar; and in Africa and Asia the highest type, catarrhine monkeys and apes, is also existent, while in America all the species are of an inferior type of monkeys—the platyrrhine group. (See MONKEY.) The Edentates are represented only in warm countries, and have most members in America (the sloths, anteaters, armadillos).

The carnivorous mammals are quite widely distributed, extending almost between the extremes of the N. and S. hemispheres, and under the same generic forms on at least the continental areas of both the Old World and the New, Australia alone having no representative except of a single species of dog (*Canis dingo*). The *Felidæ* (cat) and *Canidæ* (dog) families are especially thus distributed. The others are more limited, or have a greater number of genera restricted to limited countries. The ungulates, or hoofed mammals, are in recent times much restricted; the *Equidæ* (horses) and *Rhinocerotidæ* (rhinoceroses) being peculiar to the warmer regions of the Old World, although horses have become wild and greatly increased in numbers on the plains of S. America. The *Proboscidiæ* (elephants) are now restricted to the Old World; one generic form (*Loxodonta*) being represented in Africa, and another (*Elephas*) in Asia. Bats, fitted by their organization for extensive migrations, are found nearly everywhere; but many generic types, notwithstanding their apparently equal capability of extension, are quite confined in their range. The Cetaceans, or whales, are represented in the polar regions by peculiar genera and species, but are also rich in types common to the entire tropical zone, and have also several peculiar fresh-water types in the tropics. About 2,500 species of mammals are now recognized.

Mam'mary Glands, organs which secrete the nutritive fluid, milk, by which the young of the mammalia are nourished. They vary from two in the human female to ten or twelve in the lower mammals. Each gland is made up of separate lobes, more or less closely connected by fibrous tissue and fat. Milk is formed by the fatty degeneration of the cells lining the follicles, and from these follicles the milk flows through the lactiferous tubes to the nipple. At the base of the nipple, and extending into the gland, are reservoirs for containing a constant supply during lactation. The colored circle around the nipple is called the *areola*, which becomes darker during and after gestation. These glands present no great difference in size in the sexes until near the age of puberty, when a considerable enlargement takes place in the female; but the essential structure is the same.

Mammee' Ap'ple, fruit of trees of the order *Guttifera* (*Mammea americana* and *M. africana*), growing, respectively, in S. America and the W. Indies and in Africa. It has large oval or obovate, shining, leathery, opposite leaves, white, sweet-scented flowers, and large, round, obsoletely three- or four-cornered fruit, which sometimes grows to the size of a child's head. The fruit is covered with a double rind; the

outer is leathery, tough, and brownish yellow; the inner, thin, yellow, closely adhering to the flesh, which is firm, bright yellow, and of a singularly pleasant taste and a sweet, aromatic



MAMMEE APPLE.

smell. The pulp is eaten alone, or cut up into slices with wine and sugar, prepared as a jam or marmalade, or with sirup. The seeds are used as an anthelmintic.

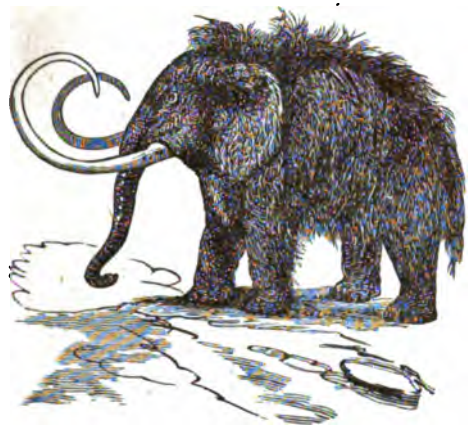
Mam'moth, fossil elephant of Siberia (*Elephas primigenius*), found in the diluvial strata of Europe and Asia, and perhaps also in N. America. There is hardly a river in Siberia in whose bed or on whose banks these remains have not been found, as well as in the neighboring plains, in connection with bones of other animals now strangers to the climate. The mammoth has never been found living, nor have any of the existing elephants been discovered in



SKELETON OF MAMMOTH.

the fossil state. Its bones are found mingled with those of the rhinoceros, ox, antelope, horse, often with marine animals, and sometimes with fresh-water shells; and these deposits afford a sufficient supply of ivory for a large trade. So perfect is the preservation of these remains by the perpetual ice which buries them that their flesh has been thawed out and eaten by exploring parties. To the *E. primigenius* belong the Siberian fossils, and most, if not all, of those of the drift of Europe. Several species of fossil elephants have been found in N. America. In the pliocene deposits of Kansas and Nebraska Hayden found bones of man-

todon and *E. imperator*, and a similar coexistence has been ascertained in the pliocene of



MAMMOTH.

Europe; the remains of *E. imperator* and *E. americanus* have been found from Alaska to Georgia and Spanish America.

Mammoth Cave, largest known cavern in the world; in Edmondson Co., Ky.; near the Green River, and about 75 m. SSW. of Louisville; discovered, 1809. It extends about 9 m., and it is said that to visit the portions already traversed requires from 150 to 200 m. of travel. This vast interior contains a succession of marvelous avenues, chambers, domes, abysses, grottoes, lakes, rivers, cataracts, etc., which for size and wonderful appearance are unsurpassed. The rocks present numerous forms and shapes of objects in the external world, while gigantic and fantastic stalagmites and stalactites abound. Chief among the objects of interest are Silliman's Avenue, about $1\frac{1}{2}$ m. long, from 20 to 200 ft. wide, and from 20 to 40 ft. high; Marion's Avenue, of about the same dimensions; the Star Chamber, about 500 ft. long, 70 ft. wide, and 70 ft. high; and Cleveland's Cabinet, an avenue about 2 m. long, spanned by an arch of 50 ft., with an average central height of 10 ft.

Proctor's Arcade is a magnificent natural tunnel $\frac{1}{2}$ of a m. long and 100 ft. wide, covered by a ceiling of smooth rock 45 ft. high. The Temple or Chief City is a chamber having an area of between 4 and 5 acres, and covered by a single dome of solid rock 120 ft. high. Lucy's Dome, the highest of the objects of this class, is over 300 ft. high and about 60 ft. in its greatest diameter. The deepest of the pits are the Maelstrom, 175 ft. in depth and 20 ft. in diameter, and the Bottomless Pit, of about the same depth. There are several bodies of water in the cave, the most considerable being Echo River, about $\frac{1}{2}$ of a m. long, 200 ft. wide at some points, and from 10 to 30 ft. deep. The river Styx, 450 ft. long, 15 to 40 ft. wide, and from 30 to 40 deep, is spanned by an interesting natural bridge about 30 ft. above it. An eyeless fish and an eyeless crawfish, nearly white, and some other animals, have been found in the cave. Another species

of fish has been found with eyes, but totally blind. In the vicinity of the Mammoth Cave are also Proctor's Cave, about 3 m. long, and White's, Diamond, and Indian caves, each about a mile long.

Mamun (mā-mōn'), Al (ABUL ABRAS ABDAL-LAH), or Abdal'lah III, 786-834; seventh caliph of the Abasside dynasty; b. Bagdad; son of Haroun-al-Raschid; Governor of Khorassan, 800; ascended the throne, 813, after the deposition and death of his elder brother, Mohammed II el Emin. He was weak, irresolute, and unable to hold his empire together. Several provinces declared themselves independent, and even over Syria and Egypt he exercised only nominal authority. He was, however, distinguished as a patron of literature and science. He himself wrote several books, and, like his father, made Bagdad the center of learning. He had the masterpieces of the Greeks translated into Arabic, and the first translation of Euclid ever made was dedicated to him.

Man, collectively, the whole human species. Man is classed as a vertebrate animal, belonging to the division of the mammalia and the order of primates. In this order he belongs to the highest family, that of the *Hominidæ*, in which he is the sole species and genus, *Homo sapiens*, man the intelligent. The two anatomical characteristics which beyond all others distinguish him from other primates are—(1) his erect position, which enables him to walk on his lower members only, leaving the higher, the arms and hands, free for other uses; and (2) the remarkable development of his brain. Of the two latest great geological periods, the Tertiary and Quaternary, man appears to have existed only in the latter. The evidence is almost conclusive that he lived in W. Europe certainly, and in America perhaps, before the Glacial Epoch. His rude stone implements have been found in the river gravels of England, France, and Spain, associated in original deposition with the bones of tropical animals, such as the hippopotamus, the African elephant, and the hyena. These belonged to the preglacial fauna of those localities. We may assume thirty thousand years as the minimum time requisite to effect all the geologic and physical changes which have taken place since the deposition of the earliest discovered remains of man's industry.

None of the oldest remains of man have been exhumed in the high N. latitudes of Europe, Asia, or America, nor in the islands of the oceans. In the early Quaternary, at the period man probably first appeared, central and S. Africa and central and S. India were large islands, cut off from the main body of the E. hemisphere by broad seas. These and allied considerations lead almost certainly to the conclusion that the birthplace of man was somewhere on the S. slope of the vast mountain chain which extends in an almost unbroken line from the N. coast of Spain E. to the Himalayas, and from our present knowledge the W. rather than the E. extremity of this chain is that which offers the higher probability of having been the cradle of the species.

The founder of scientific anthropology, Blumenbach, established five races, which he names the Caucasian, Mongolian, Ethiopian, Malayan, and American. This is the groundwork of many of the modern systems. Cuvier sought to simplify it by assuming only three races, the white, the yellow, and the black. Huxley, Haeckel, and others endeavored to define races by the appearance of the hair. Retzius maintained that the shape of the skull and the bones of the face offered the most salient traits, and on this established four subspecies—those with narrow heads and projecting jaws, with narrow heads and straight jaws, with broad heads and projecting jaws, and with broad heads and straight jaws. Others have classified the races according to the peculiarities of their languages; and others, again, according to their progress in culture. Brinton classifies the peoples of the earth as follows:

1. **THE EURAFRICAN RACE**, so called from its earliest historic location in central and S. Europe, and in N. Africa; portions of it also occupied E. Asia. Its physical traits are a white or whitish color of the skin, wavy or curly hair, and a narrow, prominent nose. Its two branches are the S. Mediterranean and N. Mediterranean, the former comprising the Hamitic and the Semitic stocks; the latter, the Euskaric stock, the only representatives of which are the modern Basques, the Aryan or Indo-European stock, and the Caucasian peoples.

2. **THE AUSTAFRICAN RACE**, so called from its earliest location in Africa in its S. or austral regions. Its physical traits are a black or dark color of the skin and eyes, hair frizzy or woolly, nose flat and broad. It is divided into three branches—the Negrillo branch, which includes the dwarfs or pygmies of the Kongo basin, the Negro branch, and the Negroid branch (Nubas, Kafirs, Zulus, etc.).

3. **THE ASIAN RACE**, located originally in central, E., and N. Asia, with an outlying branch in N. Europe. Its physical traits are a yellow or olive color of the skin, hair straight and black, nose medium and often depressed at the bridge. Its two main branches are the Sinitic (Chinese proper, Tibetans, etc.), and the Sibiric or Turanian (Mongols, Manchus, Finns, Tartars, Japanese, Kamtchatkans).

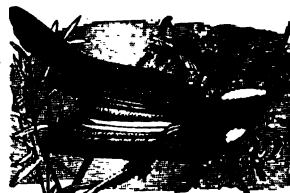
4. **THE AMERICAN RACE**, usually, though erroneously, called American Indians. Their physical traits are a coppery or reddish color, hair generally straight and dark, with a reddish undertone, nose medium or narrow. The racial peculiarities are strikingly alike throughout the continent, so that the subdivisions are mainly geographical.

5. **INSULAR AND LITTORAL PEOPLES**, who can scarcely be said to constitute a race by themselves, but rather the fragments of various races, much intermingled in blood. As a rule, they are dark in color, the hair wavy or frizzy, the nose medium or narrow. They may be classed as the Nigritic (represented by the true Nigrites of many of the tropical islands S. of Asia), Malayic, and Australic branches, the last named properly including the Dravid-

ians of India. See **ANATOMY**; **ANTHROPOLOGY**; **ETHNOLOGY**; **PHYSIOLOGY**.

Managua (mä-nä'gwä), capital of Nicaragua; near the S. shore of Lake Managua; was originally an insignificant village, but became the capital of the republic, 1855; is united by railway with Granada, Leon, and the Pacific port of Corinto. Most of the coffee exported from Nicaragua comes from plantations around Managua. Pop. (1906) 34,872.

Man'akin, name given to the members of the family *Pipridæ*, a group of small birds peculiar to tropical and subtropical America. The greater portion are birds of gay or striking plumage, red, blue, yellow, chestnut, black, and white occurring in various combinations.



GOLDEN-WINGED MANAKIN.

Manass'as Junction, Battle of. See **BULL RUN, BATTLE OF**.

Manasseh, eldest son of Joseph; was adopted by Jacob on his deathbed, and became the head of a tribe of Israel, which numbered 32,200 warriors on the exodus from Egypt and 62,700 on the entrance into Canaan. It received land on both sides of the Jordan—on the W. side, between the tribes of Issachar on the N. and Ephraim on the S.; on the E. side, N. of Gad. In the E. part lay the towns of Gadara, Gamala, Jabesh-Gilead, Gerasa, etc.

Manasseh, fourteenth king of Judah; son of Hezekiah; reigned, 689–41 B.C.; became an open idolater; was taken prisoner by the King of Assyria, and detained for several years at Babylon, but repented and was restored to his kingdom. His later reign was marked by zeal and prosperity.

Manasseh ben Is'rael, also less commonly known as **MANASSE BEN JOSEPH BEN ISRAEL**, 1604–57; Hebrew writer; b. Lisbon, Portugal; became a resident of Amsterdam, and set up a printing establishment; composed a work "The Hope of Israel," which he sent to the State Council of England, begging for the readmission of the Jews to that country. Unsuccessful, he renewed his petition, 1653, laying it before the "Barebone" Parliament, and, 1655, himself went to England, where he laid an "Humble Address" before Cromwell and published a "Declaration to the Commonwealth of England." He was well received by Cromwell, and a commission was appointed to consider the matter; but the opposition was great. After refuting the many calumnies current regarding his people in his "Vindiciæ Judæorum," and receiving a yearly pension from Cromwell, Manasseh returned to Holland. He had paved the way for the resettlement of the Jews, and in a short time large numbers went to England from Holland.

Manatee, **Laman'tin**, or **Sea Cow**, aquatic herbivorous mammal of the order *Sirenia* and



1. Teuton
2. Alpine
3. Italian
4. Swede
5. Greek
6. Russian
7. Jew
8. Persian
9. Turk
10. Turkistan
11. Lapp
12. Japanese
13. Korean
14. Chinese
15. Siamese
16. Javanese
17. East Indian
18. Filipino
19. Ladlone
20. Samoan
21. Australian
22. Papuan
23. Fijian
24. Solomon Isles
25. New Zealand
26. Zulu
27. Somali
28. Kongo Type
29. Algerine
30. Eskimo
31. Alaskan
32. Blackfoot
33. Sioux
34. Mexican
35. Pueblo Indian
36. Brazilian
37. Amazonian
38. Patagonian
39. Hawaiian



genus *Manatus* or *Trichechus*. The adult is from 8 to 12 ft. long, clumsily built, the round body merging gradually into the tail, which is flattened and rounded at the end, quite different from the flukes of the whale or dugong. Fore limbs alone are present as flattened pad-



MANATEE (*Manatus carolinensis*).

dles. The head is small, the lips thick and extensible, the eye little, the ear a mere opening. The skin is thick, rather granular, with a few deep wrinkles marking the points of movement, and sparsely sprinkled with hairs. Manatees are found in America from Florida to the Amazon and in some of the rivers of W. Africa.

Man'cha, La, old province of Spain, comprising the modern province of Ciudad Real and portions of Toledo, Albacete, and Cuenca; occupies the bare and monotonous elevated plateau of central Spain, which is bounded S. by the Sierra Morena and N. by the Alcarria. The principal towns are Almodovar del Campo, Ciudad Real, and Valdepenas. The province, of which, during the Middle Ages, the E. portion was known as La Mancha de Aragon and the W. as La Mancha, is the scene of "Don Quixote."

Man'chester, one of the capitals of Hillsboro Co., N. H.; on both sides of the Merrimac River, at the mouth of the Piscataquog; 16 m. S. of Concord. The Amoskeag Falls, the highest on the Merrimac River, with a fall of 54 ft. 10 in., provide a valuable water power, which is utilized by means of canals by large manufacturing establishments. The city owes its importance as a manufacturing center to the Amoskeag Manufacturing Company, which has controlled the water power of the Merrimac River for many years. According to the U. S. census of 1900, the city had 175 "factory-system" manufacturing plants, operated on a capital of \$26,221,000, and yielding products valued at \$46,812,000. The chief plants were the great Amoskeag, Manchester, Stark, and Amory cotton mills and the Manchester Locomotive Works, manufacturing locomotives and steam fire engines. Manchester contains a U. S. Govt. building, state industrial school, Roman Catholic cathedral, Elliott and Sacred Heart hospi-

tals, Woman's Aid Home, and training school for teachers. Pop. est. (1910) 70,063.

Manchester, most important manufacturing city of Great Britain; in Lancashire; on the Irwell River; 32 m. NE. of Liverpool. A number of bridges over the Irwell connect it with Salford, which has a parliamentary representation and a municipality of its own. Market Street, having at its W. end the Royal Exchange, the great mart of the city, is the central thoroughfare. Behind the exchange is St. Ann's Square, one of the chief shopping quarters. On King Street are the principal banks and insurance offices. Portland Street and Mosley Street contain many large warehouses. From St. Peter's Square proceeds a great arterial thoroughfare, Oxford Street. From the Royal Exchange a thoroughfare runs N. past the cathedral to the Bury New Road. The principal of the public buildings is the new Town Hall, in Albert Square, considered to be the finest municipal building in the kingdom. The new Royal Exchange, in the Italian style, is said to be the largest building in Europe devoted to commercial uses. The General Post Office is in the Italian Renaissance style. The Assize Courts, Great Ducie Street, is a noble pile of buildings, in decorated Gothic. The Art Gallery, formerly the Royal Institution, is to Manchester what the National Gallery is to London. The cathedral, the old parish church of Manchester, founded 1422, has a fine choir, and its six side chapels make it, with the exception of that of Coventry, the widest church in England. Owens College, founded 1846 by John Owens, is affiliated to the new Victoria Univ., the headquarters of which are in Manchester. The grammar school, founded 1592 by Hugh Oldham, Bishop of Exeter, has sent many exhibitions to Oxford and Cambridge. Chetham Hospital, for the education of poor boys, and the Chetham Library were founded, 1651, by Humphrey Chetham. There are upward of 130 places of worship belonging to the Church of England, and about twice that number belonging to Nonconformists. There are twelve Roman Catholic churches, several monasteries and convents, and six synagogues.

Manchester proper still has a large number of factories and works in which the various processes of cotton manufacture, calico printing among them, are carried on, sometimes on a very extensive scale, but cotton spinning itself is receding from the city to outlying districts. Machine and boiler making, iron founding, chemical works, and literally hundreds of other industries are displacing the ancient supremacy of cotton. The Manchester Ship Canal, opened May 21, 1894, much of its course being a canalized river, is 35½ m. long, twice the width of the Suez Canal, has a depth of 26 ft., allowing vessels of the greatest burden to sail from the Mersey to Manchester, and cost \$75,000,000. In the sixteenth century Manchester was noted for its woollens, which, singularly enough, were called "cottons" long before the textile use of the cotton plant was known in England. Traces of the use of the cotton woven in the textile manufactories of Manchester are found toward

the middle of the seventeenth century. Manchester sided with the Parliament in the great civil war of the seventeenth century, while in the eighteenth developed Jacobite sympathies. Except under Cromwell, the city was without parliamentary representation, but the Reform Act of 1832 gave it two members. In still more recent times it became very important politically as the headquarters of the Anti-Corn Law League. In 1853 it was made a city by royal charter. Pop. (1911) 714,427.

Manchineel', Poi'son Tree, or U'pas of Amer'-ica, very poisonous evergreen tree of the W. Indies, the *Hippomane mancinella*, belonging to the family *Euphorbiaceæ*. Its white latex or juice burns the skin on which it falls. To



MANCHINEEL.

taste its fragrant fruit would be dangerous were it not that the mouth is at once blistered by it. It is affirmed that men have died from sleeping in its shade, but it is believed that the bark of the *Bignonia leucowylon* (which often grows near by) is an antidote to the poison. The beautiful wood is of excellent quality, but is poisonous even when dry.

Manchu'ria, extensive region of China, the battlefield of the Russo-Japanese War; bounded on the N. and E. by Asiatic Russia, from which it is separated by the Amur and Ussuri rivers, S. by Korea and the Gulf of Liao-tung, and W. by Mongolia; divided for administrative purposes into the provinces of Liao-tung in the S., Kirin in the center, and Tsitsihar in the N.; capital, Mukden; estimated area, 362,610 sq. m.; pop., mostly Chinese, according to Chinese estimates, 16,000,000.

Two well-marked natural divisions present themselves, one draining to the N. and the other to the S., the dividing line being a slightly elevated ridge which stretches W. to Mongolia from the Shan-alin (or Long White) Mountains, the true main chain of the mountain system of the country, which runs in parallel ridges from NE. to SW. The division consists of large plateaus, bordered on the W. by the Hingan (or Khingan) Mountains, and traversed by several broad valleys, of which that of the Sungari is

the most remarkable. Both plateaus and mountains are covered with many dense forests, in which roam the tiger and other wild animals. The valleys and the great alluvial plains of the S. division are well cultivated, and yield large crops of pulse, barley, wheat, millet, maize, rice, cotton, indigo, tobacco, sesamum, etc. The chief rivers are the Sungari, the Hurka, and the Ussuri, which rise on the N. side of the Shan-alin and flow N. to the Amur, and the Liao, which rises in Mongolia and flows E. and S. into the Gulf of Liao-tung. Some of the peaks of the Shan-alin attain heights of from 10,000 to 12,000 ft.

The Manchus, who form about one twelfth of the population, are a Tartar people of Tungusic origin, descendants of the Jurchin or Niu-chi, who overran N. China in the twelfth century and established the Kin or Golden dynasty (later overturned by the Mongols), and of the tribes who followed Nurhachu (1559-1626) and his successors in his conquest of Liao-tung and Liao-si, in the first half of the seventeenth century, who aided the Chinese general Wu-sankwei in suppressing the rebel Litse-ching, and who retained the country for themselves, establishing, 1643, the Ta-Tsing or "Great Pure" dynasty expelled in 1912. For several years prior to the Boxer outbreak in China (1900), Russia was believed to be plotting for the acquisition of Manchuria. She obtained, on a long lease, possession of the harbors of Port Arthur and Ta-lien-wan, with considerable territory at each place, 1868; converted Port Arthur into a great naval station and fortress; established a new commercial port at Ta-lien-wan, renamed Dalny; threw an army into the territory after the Boxer uprising, ostensibly to preserve order for a specified period; and refused to withdraw at the expiration of the time. The Russo-Japanese War resulted.

Mancini (mān-ché'ně), name of an Italian family which during the minority of Louis XIV played a very prominent part in the history of the French court. The father, Michele Lorenzo Mancini, married, 1634, a sister of Cardinal Mazarin; she bore him five daughters, and to provide for his "battalion of nieces" by means of good marriages was for several years the chief aim of their uncle's policy. (1) Laure, 1635-57, married the Duke of Mercœur, and was mother of the Duke of Vendôme. (2) Olympe, 1639-1708, married the Prince of Carignan, and was mother of Prince Eugene. (3) Marie, 1640-1715, married Prince Colonna, but left him and died in obscurity. Though unprepossessing in appearance, she was accomplished and attractive, and the young Louis XIV proposed to marry her, but was prevented by her uncle. (4) Hortense, 1646-99, married the Marquis of La Meilleraye, who assumed the title of Duke of Mazarin. (5) Marie-Anne, 1649-1714, married the Duke of Bouillon.

Man'co Capac', abt. 1500-44; founder of the Inca dynasty of Peru; represented by the traditions of the Peruvians as a man of fair complexion from a distant land, who, with his sister and wife, Mama Oello, appeared on an island in the Lake of Titicaca several centuries before

the Spanish conquest, professing to be children of the sun, becoming the instructors of the Peruvians in religion and civilization, and the builders of the city of Cuzco. A reputed descendant, called Manco Capac II, brother of Atahualpa, was placed on the throne of Peru as nominal sovereign by Pizarro, 1534, escaped from tutelage the following year, assembled his people and besieged Cuzco unsuccessfully, 1536, and carried on a desultory warfare until killed by soldiers of Almagro's faction.

Manda'ans, religious sect in S. Babylonia, frequently and erroneously called Christians of St. John, Nazareans, and Sabaeans. Their history is involved in great obscurity, their own traditions in this respect being utterly worthless. They possess quite an extensive religious literature, written in the Aramaean dialect, very similar to that of the Babylonian Talmud, and in a script similar to the one brought by Syriac missionaries into Mongolia and Manchuria. Their chief works are "Ginza" (Treasure), called also "Sidrā Rabbā" (Great Book); "Sidrā de Yahyā" (Book of John), also called "Derāshē demalkē" (Discourses of the Kings); "Qolasta" (Book of Songs), "Diwan," and "Asfar Malwāshē" (Book of the Signs of the Zodiac). According to Nöldeke, these date from abt. 650-900 A.D., though they undoubtedly are based on earlier documents. According to Brandt, four layers can be distinguished in the earlier writings: (1) Oldest layer of heathen Gnosticism, polytheistic and full of mythological ideas; (2) reproduction of Christian Gnostic ideas; (3) theories in regard to life after death, drawn from Persian sources; (4) the system of "The King of Light," which is made up of Persian dualism and Christian monotheism.

Man'dalay, formerly capital of the Kingdom of Burma, and now of British Upper Burma; 3 m. from the Irawadi River, a little N. of Amarapura, the former capital; was founded 1859, and is laid out in three parallelograms, one within the other, separated by walls, ditches, towers, palisades, and other kinds of fortifications. The innermost parallelogram is occupied by the king's palace, with a spiral tower rising above his throne, and its gardens; the second by the military and the government officials; the third by the merchants and mechanics. It was taken by the British, 1885. Pop. (1901) 183,816.

Manda'mus, common-law writ issued by a court (usually one of general jurisdiction) commanding the performance by the person (a public officer or officer of a corporation) to whom it is issued of some particular and specific thing which the law provides he shall do. The following requisites must exist in order that a mandamus may be granted: (1) A right that some act should be done by an official or quasi-official person pertaining to his special functions and duty; (2) a corresponding legal obligation resting on such person to do the act in question; and (3) the absence of any other adequate legal remedy for the nonperformance of the obligation. One universal principle regu-

lates its use: it is never employed to interfere with or to control the exercise of a discretion, but only to compel the performance of a fixed and certain legal duty. The person desiring the issue of the writ makes application by affidavits to the competent court, which will then issue to the person against whom it is demanded that it shall go either a rule to show cause why the mandamus should not issue or what is known as an alternative mandamus. This procedure has the effect of bringing the defendant into court, and on the return to either the rule to show cause or the alternative mandamus the matter is decided upon its merits, and the mandamus is either granted or refused.

Manda'ra, native kingdom of central Africa, S. of Bornu and tributary to it, although lying within the spheres of British and German influence; capital, Dolu. The inhabitants are Mohammedan negroes, who are industrious in the manufacture of cotton fabrics and articles of iron, and possess a celebrated breed of horses.

Mandarin' Duck, species of duck, *Aix gale-riculata*, related to the wood duck of N. America; found in China and Japan. The plumage of the male is very gorgeous, varied with brown, yellow, and red, though these last two colors are in subdued tints. This duck is often kept in captivity, especially in China, where it is looked on as the emblem of conjugal attachment.

Man'derson, Charles Frederick, 1837-1911; American lawyer; b. Philadelphia; removed to Canton, Ohio, 1856; admitted to the bar, 1859; served in the Union army through the Civil War, becoming brigadier general; resumed practice in Canton; removed to Omaha, Neb., 1869; member state constitutional conventions, 1871, 1874; U. S. Senator, 1883-95; President *pro tem.* of the Senate, 1891-93; general solicitor Burlington system of railroads after 1895.

Man'deville, or Maundeville, Sir John, d. 1372; the reputed author of an early English book of travels. According to the account which he himself gives in the book, he was a native of St. Albans; left England in 1322, and traveled until 1357 in Turkey, Armenia, Tartary, Persia, Syria, Arabia, India, Egypt and Upper Egypt, and a great part of Ethiopia; was for some time in the employ of the Sultan of Egypt, and wrote especially for the benefit of pilgrims going to Jerusalem, where he had often been. The work was written in popular style, was widely read, and translated in manuscript into various languages, and was one of the earliest of printed books. It appears to have been first printed in German, abt. 1475; the earliest (dated) English edition was in 1499. Until quite recently it was assumed that Maundeville was a veritable person, if not the extensive traveler which he claimed to be; and he has been called the father of English prose. Recent investigations have shown (1) that the earliest known manuscript of the work is French (dated 1371), (2) that the whole, or almost the whole, of the matter is taken from earlier authors; (3) that the author is identical, in all probability, with one Jean de Bourgogne (perhaps an Englishman), who died at Liège.

Mandin'go, vast territory in W. Africa, extending E. of Liberia and Sierra Leone and N. of the European possessions and Ashanti, on the Gulf of Guinea, its N. limit being about 12° N. lat. Its people, supposed to number 5,000,000, are among the finest specimens of the negro tribes, and are divided into small states of considerable power, the largest of which is the Empire of Samory, which, though at war with the French for years, is not yet fully subjugated. The inhabitants of this region are zealous Mohammedans, and every settlement has one or more rudely built mosques. The entire region is in France's sphere of influence, and the French explorer Binger has crossed the entire region (1887-88), and was the first European to visit Kong, its most important town.

Mandio'ca. See MANIOC.

Man'dolin, instrument of music somewhat resembling the guitar and the lute. Its body is an open, shell-shaped box made of strips of bent wood. It has four or five strings, which are struck by the plectrum. The neck has a finger board. This instrument is chiefly Italian. Its sounds are peculiar, but sweet and loud.

Man'drake, perennial herb, *Mandragora vernalis* of the nightshade family, a native of the warm parts of the E. continent. It is a narcotic poison, and was used by the ancients to produce sleep and to deaden pain. Anciently it was believed to have many magical virtues: it could cure barrenness; its forked root was



MANDRAGORA OFFICINÆRUM.

likened to a man, and believed to possess a soul; it was believed to shriek so loudly when dug up that the person removing it died. Consequently, the earth was carefully loosened by one whose ears were stopped with wax, and a black dog was attached by cords to the root to drag it out. The name has been applied in the U. S. to *Podophyllum peltatum*, the May apple, of the barberry family.

Man'drill, large, powerful, and short-tailed baboon (*Cynocephalus mormon*) found in N. and W. Africa. The appearance of the full-

grown male is at once ludicrous and repulsive. The sides of the long muzzle are much swollen and of a brilliant blue, furrowed with purple and scarlet. The end of the nose is bright red, the chin has a yellow beard, while the buttocks are resplendent with red and blue. It is a hideous brute, and excels in cunning and strength, as well as in ferocity.

Manes, in Roman mythology, the souls of the departed, who were generally recognized as gods and propitiated by sacrifices at certain seasons.

Manet (mä-nä'), Edouard, 1833-83; French genre and portrait painter; b. Paris; pupil of Couture; awarded decoration of the Legion of Honor, 1882; was generally recognized as the chief of the impressionist school of painters in France, and his pictures were for several years rejected by the jury at the Salon. His influence on modern art was considerable and in the main for good. One of his most celebrated works, "Olympia," is in the Luxembourg Gallery, Paris, and at the Metropolitan Museum, New York, is a picture that shows him at his best, "The Boy with the Sword."

Man'etho, Egyptian historian, flourished in the beginning of the third century B.C. He was a priest of Sebennytus in Lower Egypt, and wrote in Greek a work on the religion and another on the history of his country. Both books are lost, but numerous fragments have been preserved by Josephus, Julius Africanus, and other ancient authors. The list of the Egyptian dynasties is the most valuable remnant of the history; the dates appear to have been derived from genuine documents, including the sacred books of the Egyptian priests, and recent discoveries have vindicated his authority.

Man'fred (PRINCE OF TARENTUM), abt. 1233-66; King of the Two Sicilies; natural son of the emperor Frederick II. At his father's death, 1250, he was appointed regent in Italy during the absence of his half brother Conrad IV, the legitimate heir. Pope Innocent IV opposed and excommunicated him. He suppressed several insurrections, and on Conrad's arrival delivered the government into his hands. Conrad died, 1254, leaving the crown to his infant son Conradin, and Manfred was again called to the regency. Innocent IV renewed his opposition to him, supported by the Guelph party in the Two Sicilies. Manfred escaped to the Saracens at Lucera, and with their aid achieved successes over the papal troops. After Innocent's death he was recognized as king, and crowned August 11, 1258, on the report of Conradin's death. This report was immediately contradicted by envoys, but Manfred refused to resign the crown. He was excommunicated by Alexander IV, and again by Urban IV, who offered his kingdom for sale. Charles of Anjou, brother of Louis IX of France, received the investiture of it, was crowned by Clement IV at Rome, January 6, 1266, and marched against Manfred, who was slain (February 26th) beneath the walls of Benevento.

Manganese (män-gä-nēs'), metal having the symbol Mn and the combining weight 55, long

known in the mineral pyrolusite. In 1774 Scheele and Bergman described the black oxide as a peculiar earth, and Gahn afterwards isolated the metal from it by mixing the pulverized mineral with charcoal and oil, forming the mass into pellets, which were exposed to the highest heat of a forge. The metal obtained in this way is very brittle, and, like cast iron, contains silicon and carbon, and has a variable specific gravity. Brunner adopted a method analogous to the one employed in the preparation of aluminum; the chloride of manganese was fused with an equal weight of fluor spar and one fifth its weight of metallic sodium. The metal thus prepared is very hard and brittle, will take a fine polish, cannot be scratched by a file, cuts glass easily, does not change in moist air, is not attracted by a magnet and is not itself magnetic, and has the specific gravity of 7.16.

The salts of the permanganates, notably the potassium permanganate, are largely employed as disinfectants, for bleaching, and in the laboratory in volumetric analysis. Manganese dioxide, or pyrolusite, occurs in nature in large quantities, and is used for the preparation of oxygen and chlorine and for neutralizing the green color of poor glass.

Various colors or dyes are prepared from salts of manganese. Nuremberg violet is made with pyrolusite and phosphoric acid. Barium manganate affords a fine green pigment, much safer than arsenic colors. Potassium permanganate dyes wood in imitation of mahogany and nut wood.

Mange (mānj), disease of dogs, horses, cattle, swine, and sheep, distinguished by the presence of acari, or mites, on the skin, and also marked by scurfiness, itching, heat, and pimples. Sulphur ointments, carbolic-acid washes, corrosive sublimate in weak solution, and decoction of tobacco or of the green leaves of Indian poke, or itchweed, are all useful applications. The afflicted animal should be kept alone, for the disease is contagious.



MANGO.

Man'go, fruit of an E. Indian tree, *Mangifera indica*, now naturalized in most warm cli-

mates. The tree is widespreading and affords a dense shade. There are many varieties of the fruit, many of which are very fine for dessert, having an agreeable blending of sweetness and acidity.

Man'gold-wur'zel (German, "beet-root"), usually written mangel-wurzel in the U. S., and often abbreviated to mangel or mangold; a name adopted into English to designate the larger and coarser varieties of the beet, extensively grown as food for domestic animals. Mangolds are too coarse and rank for human food, and even for cattle they are often harsh and irritant to the bowels when first harvested; but in a few weeks they "ripen," and then they may be fed to all kinds of stock with advantage.

Man'gosteen, tree growing with an upright stem to the height of 20 ft., and bearing a very beautiful and eatable berry, esteemed the most delicious of E. Indian fruits. It is about the size and shape of an orange; the rind is like that of the pomegranate, but softer, thicker, and fuller of juice; the inside is white or of a



MANGOSTEEN.

rose color, and is divided into several cells, in which the seeds are lodged, surrounded by a soft, juicy pulp of a delicious flavor, partaking of the strawberry and the grape. There are more than thirty species of the genus *Garcinia*, some of which furnish the gamboge of commerce. Their dried bark is astringent, and has been used in dysentery and in infusion as a gargle for sore mouth; the Chinese employ it for dyeing black.

Man'grove, shrub and tree of the family *Rhizophoraceæ*, natives of the muddy coasts, tidal estuaries, and salt marshes of hot countries, where they form dense thickets. *Rhizophora mangle* and *candelaria* are the typical mangroves. The mangrove is abundant on the coasts and keys of Florida. The fruit is eatable, the bark useful in tanning. Most of the mangroves are remarkable as invaders of the domains of the sea, which they slowly convert into

dry land. Their stems put forth long aerial roots which extend down into the waters; the seeds germinate in the fruit, and send down a long and heavy root, which on falling sinks



MANGROVE.

into the mud; and thus the mangrove swamp slowly gains on the shallow seas, spreading like a banyan grove. Mangrove bark is used for tanning.

Manhat'tan, Bor'ough of. See NEW YORK (city).

Man'ia. See INSANITY.

Manichæism (măn't-kē-Is'm), religious system which arose toward the end of the third century in the Persian Empire and became widely diffused throughout the Roman Empire. Its founder was Manes or Mani, b. Marderin, Babylon, abt. 216; who appeared, March 20, 242, as a religious teacher in Babylon, but, being unsuccessful there, he for forty years lived the life of a wanderer. He announced himself as the "Messenger of the True God," and among Christians as the promised Paraclete. Returning to Persia, he made at first a favorable impression on the king, but was finally crucified by him at Gundesapur, abt. 277. Manichæism assumes that there are two kingdoms existing from all eternity, those of light and of darkness, coexisting with and bordering on each other; the former under the dominion of God, the latter under the dominion of the demon or Hyle (matter). Every man has two souls, one of light, the other of darkness; and it is his mission to subject the latter to the former. The demon long led men astray by false religions; but at length Christ descended from the sun, assumed a bodily appearance, and taught true worship. He was not fully understood even by his apostles; hence Christ promised the Paraclete, who appeared in Manes. The Manichæans therefore

rejected wholly the Old Testament, and partially the New. They appealed to apocryphal writings, and especially to the writings of Manes, which alone they acknowledged as authoritative.

Manihiki (mă-hē-hē'kē) Islands, Polynesian group of twelve islands, occupied by the British, 1888; lie N. of the Society Islands and W. of the Marquesas; area (combined), 53 sq. m.; pop. (est.) 1,700; natives are professing Christians.

Manil'a, capital of the Philippine Archipelago, on the W. coast of Luzon and W. shore of the Bay of Manila, and at the mouth of the small Pasig River, which divides the city into two parts, that on the S. being occupied by the military defenses, and that on the N. by the commercial, mercantile, manufacturing, and residential quarters and suburbs. The city proper is surrounded by a wall, and is really only a large fort containing numerous public buildings. Most of the city lies outside the walls, and includes several suburbs of the natives. Manila is in communication with all the commercial ports of the archipelago and with the chief ports of other countries. It has communication with San Francisco, Honolulu, and Hongkong by submarine cable as well as by steamers. The city has a well-equipped observatory, a university under the Dominicans, Jesuit and Dominican colleges, colleges for women, a nautical school, a normal school, an industrial school, a natural history museum, several hospitals, and the central weather bureau for the Philippines. It is the seat of military and civil administration in the archipelago. Manila is celebrated for its hemp, or abaca, which it exports. The manufacture of tobacco, cigars, and cheroots, cord, rope, thread, ice, iron, and wood products is extensive, the tobacco industry alone employing thousands of natives of both sexes. The climate is hot and wet, but salubrious. The mean temperature is 81° F. The city is occasionally swept by the terrible typhoons from the China Sea, and is also subject to frequent earthquakes. Manila was founded, 1571, by Miguel Lopez de Legaspi. It was invaded by the British, 1762. Commerce with Spain was at first carried on by way of Acapulco in Mexico, and it was not until 1764 that Spanish vessels arrived by way of the Cape. The port was opened to foreign vessels, 1789, but commerce did not really flourish until the privileges of the Royal Company of the Philippines expired, 1834. On May 1, 1898, the U. S. squadron destroyed the Spanish fleet in Manila Bay, and on August 13th the Spanish intrenchments around Manila were bombarded by the navy, and captured by storm by the army, upon which the city capitulated. Pop. (1903) 219,928.

Manila, or **Manila Hemp** (native ABACA), fiber of a plant resembling the plantain and the banana, *Musa troglodytarum*, belonging to the family *Musaceæ*. It is cultivated principally in the Philippine Islands, and the fiber is obtained from the leaf stalk of the plant. It is largely imported for the manufacture of cordage and canvas, which is of the very best quality.

ity, exceeding hemp in durability, but not in flexibility. Old manila is used for paper stock,



MANILA HEMP TREE.

and makes a wrapping paper of excellent quality and great strength.

Manin (mā-nén'), Daniele, 1804-57; Italian statesman; b. Venice; was an advocate; became a champion of the National Party; and after the accession of Pius IX he and Tommaseo led the reform movement in Venice (1847). Their demands were moderate, but they were imprisoned in January, 1848. The revolution of March restored them to liberty, and they were placed at the head of the Republic of Venice, which was proclaimed March 23d. The Venetian Assembly having agreed to the fusion with Sardinia and Lombardy, Manin resigned. After the king's defeat at Custoza (July 25th), a triumvirate was appointed by the Republic of Venice (August 13th), Manin being its head. After the defeat of Charles Albert's army at Novara, March 23, 1849, Venice continued to resist the Austrians under Pepe, and Manin only capitulated (August 23d) on terms of amnesty to all except forty conspicuous leaders, who were doomed to exile, including himself. He spent the rest of his life in Paris as a teacher of Italian. In 1868 his remains were taken from Paris at national expense and buried with great solemnity in Venice.

Ma'nioc, **Cassa'va**, **Ju'ca**, or **Mandio'ca**, names of the *Jatropha Manihot* or *Manihot utilisima*, and of the *M. Aipi*, half shrubby plants of the spurge family of S. America, perhaps natives of Africa also. They are ex-

tensively cultivated as sources of food. From the root is prepared tapioca, Brazilian arrowroot, the Brazilian farina, and other forms of starchy food. The first-mentioned species is poisonous, but its dangerous qualities are dispelled by heat; the other species is harmless. The plants are propagated by cuttings, and produce a large amount of food.

Man'ipur. See **MUNJPUR**.

Manis'a, or **Manis'sa** (ancient *Magnesia*), town of Asia Minor; on the Hermos; about 25 m. NE. of Smyrna; is a large city, containing more and finer public buildings, mosques, minarets, public baths, and bazaars than Smyrna, and carrying on an important trade in cotton, grain, and tobacco. The streets of Manisa are generally protected against the sun by overspreading mats or vines. Pop. abt. 35,000.

Man, Isle of, island of Great Britain; in the Irish Sea; 16 m. from the nearest point of Scotland, and 27 m. from the nearest points of England and Ireland; length, 33 m.; breadth, 12½ m.; area, 227 sq. m.; pop. (1901) 54,762. It is traversed from N. to S. by mountain ranges, whose highest peak, Snaefell, rises 2,024 ft. above the level of the sea. The greater part of the island consists of clay; slate, zinc, and, in a lesser degree, copper and iron are mined, while lead is abundant. The principal mine, at Laxey, on the coast, is one of the most important in the United Kingdom. Agriculture and cattle breeding are pursued to a considerable extent; the fisheries are rich, and afford occupation to nearly 4,000 men and boys, the produce exceeding £60,000 annually in value. The inhabitants are of Celtic race, with an admixture of Scandinavian, and have a language of their own, the Manx—which, however, has been almost entirely supplanted by English. The Isle of Man has a constitution and government of its own; principal towns, Douglas (modern capital), Castletown, Peel, and Ramsey.

Manistee', capital of Manistee Co., Mich.; on Lake Michigan, at the mouth of the Manistee River; 72 m. N. of Muskegon. It is in the great peach and fruit belt of Michigan; has an excellent harbor; and ships annually 200,000,000 ft. of lumber, and large quantities of shingles, lath, pickets, wood, bark, and salt. The river is here navigable for vessels drawing 16 ft. of water. The salt interest has been developed rapidly, and the city claims to have the largest vacuum evaporating salt plant in the world. There are numerous steam saw, shingle, and planing mills, foundries and machine shops, and furniture and other factories. Pop. (1910) 12,381.

Manitoba', province of Canada; popular name "The Prairie Province"; bounded N. by Saskatchewan and Keewatin, E. by Keewatin and Ontario, S. by Minnesota and N. Dakota, W. by Saskatchewan; area, 73,732 sq. m.; pop. 455,614; capital, Winnipeg. The surface in the main is flat, but there are stretches of high land, such as the so-called Riding Mountains and the Porcupine Hills. For-

ests of evergreen and deciduous trees cover large areas; there is much swamp land, thickly timbered. Lakes are numerous, the largest being Winnipeg, 270 m. long and 20 to 60 broad; Winnipegosis, 150 m. long, and Manitoba, 130 m. long. Chief rivers, the Red, Assiniboine, and Winnipeg. Lignite coal, iron, and gold are found. Soil generally a loam, on a clayey subsoil, producing abundantly wheat, Indian corn, oats, potatoes, flax, hops, etc. Large numbers of horses, cattle, sheep, and swine are raised. Climate healthful, but cold in winter, the mercury sometimes, though rarely, falling to -50° ; spring short; duration of summer, June to September. The chief industries are farming and lumbering. In Winnipeg and its suburb, St. Boniface, there is a variety of manufacturing industries. Mills at Winnipeg, Keewatin, and other places constitute a large flour interest. There is no state church in Manitoba, each denomination supporting its own ecclesiastical establishment. There are Anglican, Roman Catholic, Methodist, and Presbyterian collegiate institutions in Winnipeg, and an undenominational college for women. Since 1888 public schools have been undenominational.

The executive is vested in a lieutenant governor and a ministry. There is a legislative assembly of forty members. Principal cities, Winnipeg, Brandon, the most important grain market, and Portage la Prairie, on the Assiniboine River and three railways. The French built a trading fort at the mouth of the Assiniboine, 1731. In 1812 the Earl of Selkirk obtained a grant of land here, and a colony of Highlanders settled at Kildonan, abt. 4 m. N. of what is now Winnipeg. The region became known as the "fertile belt" of Prince Rupert's Land. The land was resold to the Hudson Bay Company, 1836, by the heirs of Lord Selkirk. The transfer of the territory to the British Govt., 1869, led to a rebellion of French half-breeds under Louis Riel, who established a short-lived provisional government. In 1870 the British Govt. transferred its governing responsibilities to Canada; in that year the boundaries of the new province were defined (it then comprised only 14,000 sq. m.), and, 1871, the first election for the provincial legislature took place. In 1878 the government of Canada began the construction of a line of railway from Emerson, on the international boundary, to Winnipeg, and a line from Thunder Bay, on Lake Superior, to Winnipeg. The rapid construction of the Canadian Pacific Railway and its many branches quickly converted the province into a great wheat-growing district, with market centers at all the principal railway points.

Man'itou, among the N. American Indians of Algonquin stock, a name applied to any object of religious reverence or dread, whether it be a divinity, an evil spirit, a fetich, or an amulet. *Gitché Manitou* (the Great Spirit) is the Supreme Being.

Manitoulin Is'lands, group stretching E. and W. along the N. shore of Lake Huron from Georgian Bay to the N. peninsula of Michigan, the principal of which are Great Manitoulin

or Sacred Island, Little Manitoulin or Cockburn, and Drummond's. The last forms part of Chippewa Co., Mich.; the others belong to the province of Ontario, Canada, and have an area of 1,183 sq. m., and abt. 2,000 inhabitants, chiefly Indians. Great Manitoulin, about 80 m. long by from 5 to 30 m. broad, is deeply indented by numerous bays, and has an elevated surface, abounding in fine scenery.

Man'itou Springs, town in El Paso Co., Col.; 6 m. NW. of Colorado Springs, the county seat. It is in the foothills at the base of the famous Pike's Peak, and is completely surrounded by hills, on which are many tasteful cottages. Six mineral springs gives the town its name. In the vicinity is a group of caverns, discovered, 1881, and opened to the public, 1885, full of weird and imposing apartments and curious stalactite and stalagmite formations, that compare favorably with those in the Mammoth and Luray caves. Pop. (1910) 1,357.

Manizales (mā-nē-sā'lēs), city of the department of Antioquia, Colombia; on a plateau E. of the river Cauca, 6,988 ft. above the sea; is in a rich grazing district, on the road leading from the upper Cauca to Antioquia, and near a pass in the Andes by which easy access is obtained to Bogota. It was founded 1848, and has had a more rapid growth than any other city of Colombia, though it suffered greatly from the earthquakes of 1875 and 1878. Owing to its position, it is the military key to the Cauca Valley, and has been a point of great importance in the civil wars of that region. Pop. (1908) 242,000.

Manka'to, capital of Blue Earth Co., Minn.; on the Minnesota River, at the mouth of the Blue Earth; 86 m. S. by W. of St. Paul; is in an agricultural and timber region, with extensive stone quarries in and around it; has manufactures of woolen goods, linseed oil, flour, cement, fiber ware, brick and lime, foundry and machine-shop products, furniture, pipe, and candy; and contains a state normal school, Tourtellate Hospital, and public library; was the scene of several battles in the Sioux Indian War, and of the execution of thirty-eight Sioux, 1862. Pop. (1910) 10,365.

Manlii (mān'lē-i), one of the most celebrated patrician *gentes* of ancient Rome, members of which held high offices in the state for about five centuries. The first who attained to the consulship was Cneius Manlius Cincinnatus, 480 a.c. He fell in battle against the Etruscans. Marcus Manlius Capitolinus, consul, 392, obtained his surname, according to Livy, from his defense of the capitol against the Gauls (abt. 390). He was accused of aiming at kingly power, condemned to death for high treason, and thrown from the Tarpeian Rock, 381.

Mann, Horace, 1796-1859; American educator and philanthropist; b. Franklin, Mass.; admitted to the bar, 1823; removed to Boston, 1833; was often in the state legislature, where he was an effective laborer for educational and other reforms. He was secretary

of the Massachusetts Board of Education, 1837-48; member of Congress, 1848-53; Free-Soil candidate for Governor of Massachusetts, 1852, and president of Antioch College, Yellow Springs, Ohio, 1852-59. While presiding over the Massachusetts Board of Education he accomplished a great and much-needed reform in the face of opposition, public distrust, and a succession of obstacles, the narration of which seems almost incredible. He introduced many features which are now invaluable elements of the school systems of the U. S., and to him as much as to any one person is due the founding of normal schools in the U. S. His twelve annual reports to the Massachusetts Legislature, 1837-49, are of high value. He published also "Lectures on Education," "Letters and Speeches on Slavery," "Lectures on Intemperance," "Powers and Duties of Women," and supervised the publication of the "Revised Statutes of Massachusetts."

Man'na, concrete juice of a small tree native in the countries on the Mediterranean coast, the *Fraxinus ornus*. The manna of commerce is obtained exclusively from Sicily. It is in the form of cream-colored, brittle, spongy flakes of an agreeable sweet taste, and con-



THE MANNA ASH.

tains a large percentage of a peculiar sugar called *mannite*. Manna is a gentle laxative, and occasionally is used as such in medicine. The manna (Arab. *mon*) of the Sinaitic peninsula is found, during the month of June only, on the twigs and branches of the shrub *turfa*. Small pots of it are kept for sale at the convent of Mt. Sinai. The present annual yield of the peninsula is 500 or 600 lbs. only.

Mannheim, or **Manheim** (mān'hīm), town in the grand duchy of Baden, Germany; at the influx of the Neckar in the Rhine; 53 m. S. of Frankfort; is well built, very regularly laid out, and contains a ducal palace, one of the largest buildings of the kind in Germany, and several fine churches. Its manufactures are important, and its trade is large and increasing. It is connected by a fine bridge with Ludwigshafen, on the opposite bank of the

Rhine, and has a good harbor and extensive docks. Pop. (1910) 193,379.

Mann'ing, **Henry Edward**, 1808-92; English cardinal; b. Totteridge, Hertfordshire; studied theology at the Univ. of Oxford, and was appointed rector of Lavington and Graffham in Sussex, 1834, and Archdeacon of Chichester, 1840; but the Gorham case occasioned him to give up his preferments in the Anglican Church and join the Roman Catholic, 1851. After residing for several years in Rome, he was ordained a priest, 1857, and appointed rector of St. Helen and St. Mary's, Bayswater; on the death of Cardinal Wiseman, 1865, was nominated Archbishop of Westminster; and was created a cardinal, 1875. He founded the Roman Catholic Univ. of Kensington, 1874, and took a very active part in the Council of the Vatican, defending the dogma of the infallibility of the pope. Cardinal Manning was a Christian socialist, public spirited, broad in his sympathies, and a friend of the laboring classes; most prominent of his writings: "The True Story of the Vatican Council," "Independence of the Holy See," "Four Great Evils of the Day," "The Temporal Power of the Pope," "England and Christendom," "Caesarism and Ultramontaniam," "The Catholic Church and Modern Society," etc. Cardinal Manning replied to Mr. Gladstone's "Expostulation," in "The Vatican Decrees in their Bearing on Civil Allegiance," 1875.

Manoel (mā-nō-el'), **Francisco**, 1734-84; Portuguese poet; b. Lisbon; was considered the best modern lyric poet of his nation; productions consist chiefly of odes, sonnets, and epistles, and were published under the *nom de plume* of "Filinto Elysio." Among his poems is an ode to Washington. The liberality of the principles avowed in his writings led to an accusation of heresy, and he escaped the dungeons of the Inquisition only by flight to France, 1784. He made Portuguese translations of La Fontaine's "Fables," of Chateaubriand's "Martyrs," and of Wieland's "Oberon."

Man-of-war' Bird. See FRIGATE BIRD.

Mans, Le. See LE MANS.

Mansart, or **Mansard** (mān-sār'), **François**, 1598-1666; French architect; b. Paris; became early distinguished as an architect; built several churches and numerous chateaux, but of most of his buildings only prints are extant. He was the initiator of the curved roof named after him.

Mansart, **Jules Hardouin**, 1645-1708; French architect; b. Paris; nephew of the preceding; was a son of the painter, Raphael Hardouin, but assumed his uncle's name when he entered the profession of an architect; built the chateaux of Marly and Lunéville, the palaces of Versailles and Grand Trianon, and the dome of the Hôtel des Invalides, and laid out the Place de Vendôme and Place des Victoires; was general superintendent of the royal buildings, arts, and manufactures.

Man'sel, **Henry Longueville**, 1820-71; English metaphysician; b. Northamptonshire; be-

came Prof. of Philosophy at Oxford, 1859, and dean of St. Paul's London, 1868; most important work, "The Limits of Religious Thought"; also published "Metaphysics, or the Philosophy of Consciousness," "The Limits of Demonstrative Science Considered," and "Philosophy of the Conditioned." A series of his lectures on "The Gnostic Heresies of the First and Second Centuries," with a biographical sketch, was published, 1874.

Mansfeld (mäns'fält), noble German family, taking its name from the castle of Mansfeld, its original seat, now in the town of Mansfeld, Prussian Saxony. **PETER ERNST**, Count of Mansfeld, 1517-1604, spent the greater part of his life in the service of Charles V and Philip II; became, 1592, Governor General of the Netherlands; 1594, retired to Luxemburg, with the title of Prince of the Empire. **ERNST**, 1585-1626, natural son of the preceding, for his military services to the Emperor Rudolph II and Philip III of Spain was legitimated by the former; but having been denied the dignity and estates of his father, he embraced Calvinism, and became one of the most active enemies of the House of Austria. He was prominent in the Thirty Years' War, and, though repeatedly beaten, came forth formidable from every defeat.

Mansfield, Richard, 1857-1907; American actor; b. island of Heligoland, Germany; son of Mme. Mansfield-Rudersdorff, the singer; after playing in London and the English provinces in comic opera, comedy, and tragedy made his first appearance in the U. S. at the Standard Theater, N. Y., as *Dromex*, in the opera "Les Manteaux Noirs," 1878; as *Baron Chevalier* in "A Parisian Romance," 1883, made an instantaneous hit; began his career as a star, 1886, in the play of "Prince Karl." Among other parts successfully performed are *Dr. Jekyll* and *Mr. Hyde* in the dramatized form of that story; *George Brummel*, in "Beau Brummel"; *Don Juan*, in his own "Don Juan"; *Emperor Nero*, in "Nero"; *Shylock*, in "The Merchant of Venice"; *Captain Bluntschli*, in "Arms and the Man"; *Cyrano*, in "Cyrano de Bergerac."

Mansfield, William Murray (Earl of), 1705-93; British jurist; b. Scone, Scotland; son of Viscount Stormont; called to the bar, 1730, and settled in London; elected to Parliament, 1742; appointed solicitor general; conducted the prosecution of the noblemen convicted of treason as Jacobite leaders; reelected to Parliament, 1747, 1754; became attorney-general, 1754, and chief justice of the King's Bench with the title of Baron Mansfield and a seat in the cabinet, 1756. While temporarily Chancellor of the Exchequer, 1757, he effected the coalition between Pitt, Fox, and Newcastle which resulted in the formation of the ministry of the former. Created Earl of Mansfield, 1776; retired from the bench, 1788.

Mansfield, town; county of Nottingham, England; has a grammar school founded, 1561, a townhall, manufactures of lace thread and iron, and a large trade in corn, malt, and cattle. Pop. (1901) 21,445.

Mansfield, capital of Richmond Co., Ohio; 180 m. N.E. of Cincinnati; has manufactures of agricultural implements, flour, stoves, pumps, street cars, boilers, engines, cigars, tubing, etc., and a large wholesale mercantile trade; and contains the Ohio State Reformatory, Soldiers' and Sailors' Memorial Building, Mansfield Lyceum, and memorial libraries, two public parks, and a Holly water-works plant. Pop. (1910) 20,768.

Mansfield, Mount, highest of the Green Mountains, in Cambridge, Vt.; 4,389 ft. above sea level; presents a grand appearance; summit affords one of the finest views in New England.

Man'slaughter, in law, the unlawful and felonious killing of another without any malice express or implied; that is, without the intent to kill, either proved by direct evidence or inferred from the facts of the homicide, which raises the crime to murder. It is commonly separated into two classes, the *involuntary* and the *voluntary*. Involuntary manslaughter is the accidental killing of another by one doing an unlawful act, not a felony, or the causing of another's death through culpable neglect of a duty; voluntary manslaughter arises when on a sudden quarrel two persons fight and one kills the other, or when one greatly provokes another by personal violence, and that other immediately kills him. In the U. S. the different classes and degrees of manslaughter are defined by statute, and the appropriate punishment prescribed for each. See HOMICIDE; MURDER.

Mantegna (män-tän'yä), **Andrea**, 1431-1506; Italian artist; b. Padua; painted many frescoes in Mantua, Padua, and Rome. Of his works extant, the most celebrated is the series representing the triumph of Julius Cæsar after his conquest of Gaul, originally painted for Ludovico Gonzaga, and subsequently purchased by Charles I of England. They were sold by Parliament, but purchased on the return of Charles II, and placed in Hampton Court. Of his easel pictures, the most famous is the "Madonna della Vittoria," in the Louvre. According to Lanzi, he engraved more than fifty of his own designs, being the first in Italy to engrave on metal for printing.

Man'tell, Gideon Algernon, 1790-1852; English geologist; b. Lewes, Sussex; discovered four out of five of the genera of extinct dinosaurian reptiles, viz., the *iguanodon*, the *hylæosaurus*, the *pelorosaurus*, and the *regnosaurus*, and collected a valuable museum. His chief scientific work separately published is "Fossils of the South Downs"; also the author of "The Wonders of Geology," "The Medals of Creation," and other works illustrating the geology of the British Isles and his own discoveries, including a "Pictorial Atlas of Fossil Remains."

Manteuffel (män'toi-fel), **Karl Rochus Edwin** (Baron von), 1809-85; Prussian military officer; b. Magdeburg; often held very important positions, especially of a diplomatic character; exercised a decisive influence on the reorganization of the Prussian army; was made

a lieutenant general, 1861; was active in the negotiations between Austria and Prussia which ended with the convention of Gastein; and was appointed Governor of Schleswig, 1865. In 1866 he commanded the army of the Main; in the Franco-German War drove Bourbaki across the Swiss frontier; 1873, was made a field marshal, and, 1879, was appointed Governor of Alsace-Lorraine.

Mantine'a, one of the oldest and most important cities of Arcadia, on the brook Ophis in the narrow part of the plain of Tegea. The city was formed in the fifth century B.C. by the union of five villages, into which the Spartans dissolved it again from 385-371 B.C. In 362 B.C. it became famous as the scene of the battle between the Thebans and the Spartans in which Epaminondas fell. From 222 B.C. up to the time of Hadrian the city bore the name of Antigoneia.

Man'to, in Greek mythology, daughter of Tiresias, the blind seer of Thebes. After the capture of Thebes by the Epigoni of the Seven Heroes, Manto fell to Alcmeon, by whom she became the mother of Amphilochus and Tisiphone. Alcmeon then presented her to the oracle at Delphi. According to another myth, Manto married the Cretan seer Rhacius, and by him became the mother of Mopsus, another distinguished seer.

Man'tua, capital of province of same name and the strongest fortress of the celebrated Quadrilateral and even of Italy; 8 m. N. of the Po; 95 m. ESE. of Milan; is built on two islands formed by the Mincio, which here spreading out creates a lake that encircles the city. The channel or canal between the two islands dividing the city is called the Rio. The public and private buildings have a grand mediæval aspect, and are very rich in works of art. The town has five gates and a dockyard, called Porta Catena, whence there is navigable communication with the Po, making it an important port. The Cathedral of Mantua was designed by Giulio Romano. The Church of St. Andrea is magnificent, that of Santa Barbara very elegant. The old ducal palace is very sumptuous, with frescoes by Mantegna, Giulio Romano, etc. Mantua was one of the political and religious centers of the Etruscans. Cæsar bestowed upon it the privilege of Roman citizenship. In the eleventh century it belonged to the celebrated Countess Matilda, and after her death passed to the Emperor of Germany. In 1328 the duchy was governed by Luigi Gonzaga, the first of an illustrious house that retained its power for three hundred and seventy-nine years. In 1708 it again fell to Austria. Wurmser, the Austrian general, surrendered it to Bonaparte, 1797, after which it became a part of the Cisalpine Republic. In 1814, having changed masters several times meanwhile, it submitted again to Austria. The Treaty of Vienna, 1866, made it a part of the Kingdom of Italy. Pop. (1907) 29,344.

Manu (mā'nō), or Me'nu, a revered name in Indic literature. In its oldest usage the word denotes man primeval, representative man,

Manu, father of mankind. More particularly, however, *Manu* is the name given to the legendary Hindu lawgiver, a Minos of the Brahmins, and supposititious author of the *Mānava-dharma-gāstra*, the ordinances of Manu, or law book of the Manavans, the earliest and most important law code of India. The existence of Manu as a historical personage is now denied; the code bearing the name is regarded as a collection of institutions of "man," founded on Hindu tradition and usage from time immemorial.

Man'ual Train'ing, training of the hand in the use of tools and in practical drafting, as a part of a system of general education. The work with the tools is done in such materials as wood, iron, brass, tin, clay, cardboard, and paper, and the drafting consists in the preparation of working drawings suited to such tool work. The term manual training does not include kindergarten work, laboratory work in science, and illustrative teaching on the one hand, or the teaching of trades on the other. Finland introduced certain elementary work into her lower schools as early as 1866, and a few years later a system of manual training called *sloyd* was established in Sweden. In 1868 Victor Della Vos, director of the Imperial Technical School for Government Engineers at St. Petersburg, conceived the plan of first teaching the elements of a certain kind of tool work systematically by means of models and drawings and practice exercises, before any attempt should be made at the execution of trade work, his motto being "instruction before construction." His discovery started a revolution in tool instruction which is still going on.

In 1877 a manual training school in connection with the Massachusetts Institute of Technology was founded, and, 1879, the St. Louis (Mo.), Manual Training School was established. Schools were established in Chicago, Baltimore, and Toledo, 1884, and in Philadelphia, 1885. Since the latter year manual-training schools and manual-training courses in existing schools have multiplied, and manual training is now an integral part of the curriculum in every agricultural and mechanical college in the U. S. Official reports show that in more than one-half of the cities of the U. S. having 4,000 and upward population manual training is taught in some of the grades of the public schools, and, 1910, there were 26,637 pupils in public high schools—16,834 boys and 9,803 girls. In this summary are included the schools and pupils representing industrial training, an extension of manual training proper in which certain trades are taught. In 1910 in nearly 1,400 cities of the U. S. having a population of 4,000 manual training was taught in 257 high schools. There were also reported 265 independent manual training schools, not including Indian schools. See EDUCATION; PEDAGOGICS.

Man'ucode, name for certain birds of paradise of the genera *Phonygama* and *Manucodia*. They are 15 to 18 in. in length, of a beautiful steel blue, and have the third and fourth toes united for some distance.

Manuel (mā-nō-ēl') I (COMNENUS), 1122-80; Byzantine emperor; succeeded his father, John II, 1143; reign was a succession of campaigns against Geisa II, of Hungary, the Serbians, Roger of Sicily, the Egyptians, Raymond of Antioch, and the Seldjuk Turks. At Myrioccephalus, Pisidia, he suffered a terrible defeat from the Turks, over whom he afterwards gained some successes, but a profound melancholy took possession of him; he abdicated and became a monk. **MANUEL II** (PALÆOLOGUS), 1348-1425; Byzantine emperor; succeeded his father, John V, 1391. Little was left for him to rule over, for the Byzantine Empire comprised hardly anything more than Constantinople. Balezid I had forced John V to give him Manuel as a hostage, but on his father's death Manuel escaped from the Ottoman camp and was crowned. He made a journey, 1400-2, to Italy, France, and England to entreat help against the Ottomans, but everywhere in vain. Constantinople was attacked, 1423, by Mourad II, when cannon were used for the first time in siege, but was heroically and successfully defended by Manuel. It was impossible to resuscitate his empire, but he did his utmost in delaying its fall.

Manuel II, 1889- ; King of Portugal; proclaimed king February 2, 1908, after the assassination of his father Don Carlos and his elder brother, the Crown Prince, Luiz Philippe, Duke of Braganza. He was brought up on the estate of his mother, the Princess Amelie of Orleans, from whom he received his early education and a taste for hunting and other athletic sports, and who exercised a powerful influence throughout his youth. He was deposed, October 5, 1910, when a successful revolution established the present Portuguese republic.

Manure. See FERTILIZER.

Manuscript, any writing, usually a written book or document. Manuscripts are distinguished on the one hand from inscriptions, on the other from printed books. The oldest MSS. left us are Egyptian, and date from twenty-five hundred years or more B.C. They are written in characters already alphabetic, with reed and ink, on papyrus. Other materials—the leaves and bark of trees, tablets of wood or ivory, pottery, skins, linen cloth, sheets of lead—were in early use for writing, and have left us memorials in such familiar words as “library,” “code,” and “book”; but from Egypt the use of the more convenient papyrus spread, like the alphabet itself, to the other Mediterranean lands. One form of book, however, besides the papyrus MS., remained in use throughout the classical time, and indeed almost to modern days—the waxed tablet or set of tablets, fastened by rings serving as hinges, on which one wrote with a metal stylus.

It was this form of book, used not only for memoranda and letters, but for accounts and legal documents, which was known as *codex* and which lent both form and name to the mediæval MS., the parent of the modern book. In antiquity the more common form, though even for the brittle papyrus the codex was not

unknown, was that of the roll—*volumen*. The sheets of papyrus were pasted together, end to end, to any desired length, the width of the roll varying from 6 in. in the earliest times to 10 or 15 in the later. In Roman times one end of the roll was affixed to a wooden or ivory roller, which thus became the core of the roll. A label bearing the title of the book was attached to the outside of the rolled-up MS.; and it was usual to provide the whole with a vellum case. From very early times, besides papyrus, skins were in use, even in Egypt, as a writing material; but not till the second century B.C. did the increasing demand for books and the competition of Pergamos with Alexandria as a literary center lead to such improvement in their preparation that they could rival papyrus; it was yet several centuries before this “Pergamos paper,” *carta Pergamena*, our *parchment*, as it was called from the town whence it came, became with the decline of Mediterranean commerce the usual material for MSS. throughout Europe. Papyrus did not disappear entirely indeed till in the twelfth century the cheaper *paper*, whose manufacture was then creeping W. from the Orient, crowded it from use and inherited its name. With the advent of parchment (or *vellum*, as it is indifferently called), the codex, or tablet, form of MS. gradually supplanted the roll.

The ordinary pen of the ancients was the reed, though metal pens were not unknown. The quill is first mentioned in the sixth century A.D., but from that time became the exclusive implement in the W. Colored inks were early in use, and the custom of illuminating MSS.—i.e., of adorning them with variegated letters or with pictures—was known to the ancients, and never passed from use till its culmination in beauty in the closing centuries of the Middle Ages. It is from the favorite red (*rubrica*, *minium*), beloved both for head lines and for initials, that we get our words *rubric* and *miniature*. Throughout W. Christendom every abbey had its *scriptorium* or writing room, and the copying of books was counted one of the most meritorious of monkish tasks, profitable for this world and for the next; but in the thirteenth century, with the rise of the universities there grew up again a body of lay copyists into whose hands the making and sale of MSS. gradually passed. The scarcity and cost of parchment led often to the erasure of a writing with sponge, pumice stone, or knife, and the use of the sheet for a fresh writing. Such rewritten MSS. are *palimpsests*. The science which treats of the decipherment of MSS. is *paleography*, the older name of diplomatics being now restricted to the science which verifies and interprets documents (diplomas). See ILLUMINATED MANUSCRIPTS.

Manutius (mā-nū'shī-ūs), or **Manusio** (mā-nōt'sē-ō), Aldus, abt. 1449-1515; Italian printer; b. Sermonetta, territory of Bassano; established, 1488, a printing press at Venice, from which issued a series of editions of Greek and Latin authors which acquired a great reputation, and are still highly prized for their correctness. Manutius was himself a good scholar,

and was helped by a number of other scholars who, with him, formed the so-called Aldine Academy. He substituted for the current Gothic, or monks' type, a new one, the Italic or cursive. The first book ever printed in Greek letters issued from his press, 1494. His son Paulus (1512-74) took charge of the press, 1533, and printed editions of the Church Fathers and of the complete works of Cicero, etc. Aldus (1547-97), son of Paulus, took up his father's business, but before his death (he was then head of the *Typographica Vaticana* in Rome) the famous house had fallen into decay. The Aldine editions are among the most beautiful specimens of the typographer's art.

Manzanillo (mān-thā-nēl'yō), port on the S. coast of Cuba, Santiago de Cuba province, and the outlet for all the products of the Cauto River basin, including tobacco, sugar, wax, honey, and other agricultural commodities. It is situated on a fine bay. Pop. abt. 15,000.

Manzoni (mān-dzō'nē), Alessandro (Count), 1785-1873; Italian author; b. Milan; grandson of Marquis Cesare Beccaria, author of the famous treatise "Crimes and Their Punishment"; lived in Paris, 1805-7; was for a time a skeptic, but became a firm Roman Catholic; spent most of his life in Milan. He sympathized with the efforts to bring about a united Italy, and when this had been accomplished he was made a life Senator by the new government and given a pension. His chief works are "The Betrothed Lovers," an historical novel; two tragedies, and an ode on the death of Napoleon.

Maoris (mā'ō-riz), Polynesian people of New Zealand, numbering (1908) abt. 49,000, probably far less than half the population of a century ago. Many of them live in that part of the North Island comprising about 10,000 sq. m., known as the King Country. This district was set apart for their use, 1840, by Great Britain. The chiefs, seeing that their authority over the tribes diminished with the advance of European settlement, convened a great tribal gathering, 1854, and it was decided that no land should be sold to the government, that no roads should be made by Europeans within the area, and that a king should be selected to reign over the Maoris. These provisions were all carried out. While the Maoris are still scattered over a considerable part of North and Middle islands, the King Country, in the W. of North Island, is exclusively occupied by them. The Maoris are among the finest of the so-called savage races. Physically they were, when first known, among the finest specimens of the human race. Their half-savage, half-civilized mode of life, however, has caused rapid deterioration. The few tattooed warriors of the old school who are left are much superior, physically and mentally, to the younger natives.

Map, representation of a portion of the earth's surface, or of the celestial sphere, on a plane. By the method called projection, the rules of perspective are applied to the delineation of objects upon the earth's surface according to four principal modes. In the orthographic projection the eye is supposed to be at

an infinite distance from the sphere, so that the rays of light coming from every point of the hemisphere opposite to it may be considered as parallel to one another. In the stereographic projection, the eye is supposed to be placed at the surface of the sphere, and the surface to be delineated is the opposite hemisphere or a portion of it, of which the inner or concave side is presented to the eye. In the central or gnomonic projection, the eye is supposed to be at the center of the earth, and the objects on the surface are projected on a plane which is a tangent to its surface. In the globular projection, the eye is supposed to be at a distance from the sphere equal to the sine of 45°; or, the diameter being 200, this distance is 70.7. Another method of map making is based on the principle called development, which is a mode of projecting the forms on the surface of the earth on the inner surface of a cone or of a cylinder, which is supposed to envelope the earth and touch it only around the circle which is to be the middle latitude of the map. This principle is in part the foundation of the projection known as Mercator's, and applied by him to charts for navigators. Still other principles are employed in constructing maps, according to the special purposes for which they are designed.

In maps of small areas the positions and forms of bodies may be represented as if the surface were itself a plane. Some have special objects in view, as the delineation of the coast lines, channels, shoals, reefs, etc.; hence called hydrographic maps or charts; others are intended to show political divisions; and others, designated topographical maps, to represent the natural features of a country. Maps have also been constructed to represent the courses of the winds and oceanic currents, to designate the position of the isothermal lines, to indicate geological formations, and others to indicate the flora and the fauna. In the construction of geographical maps covering large areas, the principal places are located according to their latitudes and longitudes. The first map of the world is said to have been made by Anaximander the Milesian, 611-547 B.C. Eratosthenes, b. 267 B.C., introduced the lines of latitude and longitude, and the use of these was established by Hipparchus on a mathematical principle. Still, the maps of the ancients were extremely inaccurate. Even those of Strabo and Ptolemy contained most extravagant errors, and some of their gross exaggerations were continued in all the maps down to the commencement of the eighteenth century. In 1700 De Lisle published a new map of the world, founded on comparatively accurate astronomical observations, in which many errors from the maps of the ancients were first corrected. Maps were first engraved on metal by Bücking and Schweyheim, 1478, and on wood by Holl, 1482. See *GLOBE*.

Ma'ple, name given to trees of the genus *Acer* and family *Sapindaceæ*; natives of N. America, Asia, and Europe. The American species are (1) The sugar maple (*A. saccharinum*), called also hard or rock maple, and its variety, *nigrum*, the black maple. In Canada and the N. part of the U. S. great quantities of sugar of good quality are made

MAPLE

by boiling the sap of this tree. It is used extensively in making furniture, especially the peculiar forms of the wood called bird's-eye and curled maple. (2) The white maple or silver maple (*A. dasycarpum*), a fine shade tree; its soft and white wood is not of value as fuel or timber, but is used for making shoe-



EUROPEAN MAPLE.

makers' lasts. (3) The red or swamp maple (*A. rubrum*), which shares with the preceding the name of soft maple, the red blossoms of which appear considerably later, but before the leaves. (4) The striped maple (*A. pennsylvanicum*), sometimes called moosewood, and (5) the mountain maple (*A. spicatum*) are small trees or tall shrubs of little importance, although the former is planted for ornament.



SUGAR MAPLE.

These are the Atlantic U. S. species. In the Rocky Mountains occur (6) *A. glabrum*, a handsome small tree, and (7) *A. grandidentatum*, of larger size. Finally Oregon and California have two species—(8) the vine maple (*A. circinatum*), a small tree or large shrub; (9) the large-leaved maple (*A. macro-*

MARABOU STORK

phyllum), a very handsome tree, but never very large; its timber hard and close grained, and greatly valued in Oregon. To the foregoing may be added two species of box elders now placed in this genus—(10) *A. negundo* of the E. U. S. and (11) *A. californicum* of the Pacific slope. The box elders are often called ash-leaved maples.

Of European species, the species commonly planted in the U. S. for shade and ornament are the Norway maple (*A. platanoides*), a round-headed tree with bright green leaves, most like those of sugar maple, and the sycamore maple (*A. pseudoplatanus*), in England called simply sycamore. The wood of the latter is much used in Europe for carving.

Ma'pleson, James Henry, 1832-1901; English operatic manager; b. London; was first violin in the orchestra of Her Majesty's Theater, London, 1848; manager of an opera company which toured the provinces, 1849; became the recognized director of Italian opera at Drury Lane, London, 1858, and introduced Adelina Patti to the public; later was lessee of Her Majesty's Theater, and first produced "Faust" in London; made a number of visits to the U. S. He wrote "The Mapleson Memoirs."

Maquet (mă-kă'), Auguste, 1813-87; French novelist and playwright; b. Paris; became professor in the Collège Charlemagne, 1831, but later turned to literature; collaborated with Alexander Dumas in some of the latter's most famous novels and their dramatizations: "The Three Musketeers," "The Count of Monte-Christo," etc. After his separation from Dumas, Maquet produced a number of novels, most of which he also dramatized: "The White Rose," "Wrong Side and Right Side," "The Count of Lavernie," and others.

Marabou (măr-ă-bô'), Stork, large stork (*Leptoptilos marabou* or *crumenifer*) of W. Africa, having a huge bill and an enormous pouch



MARABOU.

on the neck. The marabou feathers of commerce are obtained from this bird and from the E. Indian adjutant (*L. argala*).

Marabouts (mār-ā-bōts'), kind of half priestly caste in the NW. of Africa, descendants of the Almoravide sovereigns of Spain and Morocco. They profess to exercise miraculous powers, and are greatly revered by the common Mussulmans. They preside in all popular assemblies and decide intertribal and important questions. Though dependent on alms, they are very liberally supported.

Maracaibo (mā-rā-kī'bō), capital of State of Falcon, Venezuela; on the W. side of the strait connecting Lake Maracaibo with the ocean, at the N. end of the lake. The pleasant suburb of Hatitos, to the S., contains many of the finest residences. Maracaibo is the center of trade not only for the lake towns, but a large portion of the states of Falcon and Los Andes, and of E. Colombia. The most important article of export is coffee, most of which goes to the U. S.; other exports are cacao, hides, dyewoods, cattle, coconut oil, and drugs. The harbor is good, but large vessels cannot reach this point. Two railways start from here. A settlement made 1568 was destroyed by corsairs, but it was rebuilt by Pacheco, 1571. The prosperity of the port dates from the destruction of Gibraltar, by the pirate l'Olonais, at the S. end of the lake, 1668, the commerce of that place finding this new outlet. Maracaibo was long the literary center of Venezuela. Pop. (1906) 50,000.

Maracaibo, Gulf of, or Gulf of Venezuela, inlet of the Caribbean Sea; in the NW. coast of Venezuela; between the peninsulas of Paraguaná on the E. and Goajira on the W. At its S. end it receives the outlet of Lake Maracaibo.

Maracaibo, Lake, great sheet of water in NW. Venezuela, principally within the State of Falcon, but at its SE. end bordering on Los Andes; area, 8,392 sq. m. Its outlet, opposite the city of Maracaibo, is $8\frac{1}{2}$ m. wide; below it broadens, but 20 m. from Maracaibo is again shut in by several islands, between which it communicates with the Gulf of Maracaibo. The depth in parts reaches 500 ft., but vessels drawing more than 10 ft. cannot enter, owing to sand bars in the passages between the islands.

Maragha (mā-rā-gā), town in province of Azerbaijan, Persia; on the Safi; 60 m. S. of Tabriz. The raisins of this vicinity are considered the best in Persia. The manufactures of glass are considerable. Close by are the famous Maragha marble pits, where the marble is cut in slabs so thin that it is nearly transparent. Pop. (1900) 15,000.

Marajó (mā-rā-zhō'), on old maps sometimes called JOANNES', large island of State of Pará, Brazil; on the SE. side of the mouth of the Amazon, between the river and the Pará; length, about 120 m.; breadth, from 80 to 100 m.; area, about 10,000 sq. m. Pop. (1900) 20,000.

Maranhão (mā-rān-yā'ōā), in old books **MANHAK**, state of Brazil; bounded N. by the Atlantic, SE. by Piauí, W. by Goyaz and Pará; area, 177,561 sq. m.; pop. (1900) 459,508; capital, Maranhão; was settled by the French,

1612, though lying within the territory claimed by Portugal; possessed by Portugal, 1615; occupied by the Dutch, 1641-44; became a province under the empire, and a state, 1891. The capital is on the island of São Luiz, at the entrance of the Bay of São Jose; has a good harbor, but difficult of ingress. Pop. abt. 40,000.

Marañon (mā-rān-yōn'), name given by Peruvians to the Amazon. Geographers generally restrict the name to the Upper Amazon, beyond the limits of Brazil. See **AMAZON**.

Maraschino (mā-rā-skē'nō). See **LIQUEUR**.

Maras'mus, general wasting of the entire body, including all the tissues and organs, depending on one or more of many causes. Two general classes may be described: (1) Premature marasmus—a decline, as above, due to any disease which may reduce the general strength and nutrition for a long-continued period, by virtue of malassimilation or too rapid tissue disintegration. In the new-born infant marasmus may result from premature birth, exhaustive hemorrhages, hereditary syphilis, suppuration, chronic diarrhea, or early occurrence of an infectious disease. Most frequently, however, it is seen somewhat later as the result of insufficient and improper nourishment (not an actual lack of food) generally in bottle-fed infants, especially those with poor hygienic surroundings, causing a disturbance in the absorption of the nutritive elements in the intestine.

In these cases, when not too far advanced, much can usually be done by careful attention to the proper articles of diet and general management. In adults this condition sometimes follows chronic diseases in which the system is drained, such as recurring hemorrhages, prolonged suppuration, chronic diarrhea, long-continued fevers, as in tuberculosis, syphilis, diabetes, malignant tumors, and some diseases of the blood. It may also be brought about by some forms of mental disease, as well as by continued privation or the excessive use of intoxicants. (2) Senile marasmus is a similar condition seen in old age; the seventieth year is said to be the time of its most frequent occurrence. No direct causes for this wasting are necessary, as it is the result of natural decline in the vitality of the tissues, etc., and therefore must occur to some extent at an earlier or later period, not being due to any irregularity in assimilation or disintegration.

Marat (mā-rā'), Jean Paul, 1744-93; French revolutionist; b. Boudry, Switzerland, of Protestant parents; practiced as a physician in London, where he published an "Essay on Man," an attack on the philosophy of Helvétius; published in Edinburgh, 1774, "The Chains of Slavery"; taught languages in that city; settled in Paris, 1775; practiced as a physician; wrote able works on optics and electricity; and at last entered the service of the Count of Artois, afterwards Charles X, who appointed him brevet physician to the guards. The revolution made him prominent as a demagogue who influenced the lowest classes, chiefly through a paper, *The Friend of the People*, later called *The Journal of the French*

Republic, published 1789-93. Incurring the anger of all parties by his violent attacks, he was forced to take refuge in London, 1790, but returned in two months. The cruelties and massacres of September, 1792, were largely due to his influence. He was elected to the convention, was involved in a life-and-death struggle with the Girondists, and led the movement which resulted in their downfall. In April, 1793, he obtained the enactment of the law against suspected persons, in virtue of which 400,000 were imprisoned. He was killed by Charlotte Corday.

Mar'athon, plain on the coast of Attica; abt. 6 m. long, $1\frac{1}{2}$ m. wide, 22 m. ENE. of Athens by one road and 26 m. by another. The river Charadrus runs through it, and two little hamlets (Vrana and Marathona) are on its W. edge, under the hills. The battle fought there, September, 490 B.C., is one of the most important in history. On the Greek side there were 9,000 or 10,000 Athenians and 1,000 Plateans; on the Persian side at least 100,000, and perhaps 200,000. There fell of the Persians 6,400 and of the Greeks only 192, who were buried under the mound which still remains.

Marbeau (mār-bô'), Jean Baptiste, François, 1798-1875; French philanthropist; b. Brives; was an advocate and writer on legal and social subjects, and, while Adjunct Mayor of Paris, 1844, founded the first infant asylum (crèche) at Chaillot, which led to the establishment of hundreds of others all over France. His work on the subject, 1845, received a Montyon prize of 3,000 fr., which he presented to one of these institutions.

Mar'ble, rock used as an ornamental building stone, for interior decorations, and for sculpture. Generally, any limestone that can be obtained in large, sound blocks, and is susceptible of a good polish, is marble; and the only marble that is not limestone is the serpentine and the Oriental verd antique. It is found in beds in various geological formations. In the azoic group it is a metamorphic rock of granular and crystalline structure, well fitted for sculpture. In the paleozoic formations it has a sedimentary character, and often contains fossil shells, which sometimes compose nearly its whole substance; it is also of variegated colors, and sometimes is evidently made up of fragments of an older rock, the layers of which, broken up and confusedly rearranged, have been cemented together. All marbles are a carbonate of lime, or a compound of this and carbonate of magnesia. Marble is soft and easy to work with the chisel, generally of even grain so as to be split with wedges, and of specific gravity about 2.7, making the weight of a cubic foot about 169 lb. Its durability is variable, some varieties retaining sharp edges when exposed for many years to the weather, and others soon crumbling away.

The names of many marbles famous among the ancient Greeks and Romans are still retained, and their localities are known. Mt. Pentelicus, in Attica, furnished the valuable Pentelican white marble, and the islands of Paros and Naxos the still celebrated Parian

marble, though nearly all the statuary marble comes from the quarries of Carrara, Italy; but a small quantity is produced at Rutland, Vt. Black marbles are occasionally referred to by the ancients. The green marbles were serpentine from various localities. Yellow marble was obtained at Corinth. The marmor Phenigites of Cappadocia was white, with yellow spots; the Rhodian was marked with golden-colored spots, and that of Melos (Milo) was yellow. In the U. S. the average annual production has a value of about \$7,000,000; Vermont (\$4,000,000), New York, Georgia, Tennessee, Massachusetts, Maryland, Pennsylvania, California, and Washington being the chief producing states, in their order.

Mar'burg, Conference of, conference which took place October 2-5, 1529, between the Swiss and the German Reformers, and was brought about by Landgrave Philip of Hesse for the purpose of putting an end to the controversy concerning the Lord's Supper. Zwingli was anxious for reconciliation, but Luther refused Zwingli's hand of brotherhood; yet at the conclusion both parties signed a common confession which set forth their agreement on everything save the presence of Christ in the eucharist. The agreement prepared the way for the Augsburg Confession.

Marcellinus, Saint, d. 305; bishop of Rome who succeeded Caius, 296. The "Liber Pontificalis" states that under an outburst of persecution Marcellinus became a *thurificatus*—that is, a Christian who sacrificed incense on the altar of some idol in order to escape persecution; but later he repented of his action, and was "beheaded and crowned with martyrdom," and the statement is accepted even by Roman Catholic writers.

Marcellus, Marcus Claudius, abt. 268-08 B.C.; Roman military officer and statesman; member of an ancient family of the gens *Claudia*; was made consul, 222, and won a victory over the Insubrian Gauls; when consul for the third time invaded Sicily, 214, and took Leontini, and after a two years' siege, Syracuse; continued to be one of the leading generals, and when in his fifth consulship was placed in the field against Hannibal, by whom he was defeated and slain near Venusia, Italy.

Marcellus I, Saint, d. 310; b. Rome; said to have become Bishop of Rome, 308, and to have been forced by Maxentius, the emperor, to become a slave in the stables.

Marcellus II (MARCELLO CERVINI), d. 1555; pope; was cardinal legate of Julius III at Trent; became pope, retaining his own name; held the pontificate only twenty-two days before his death.

March, Ausias, d. abt. 1459; Catalan poet; b. Valencia, of a wealthy and eminent family. He seems to have taken part in the conquest of Naples by Alfonso V. By general consent he is the best poet in the whole history of Catalan literature. We have from him ninety-three love songs, eight laments, fourteen moral poems, and a beautiful devotional poem.

March, principal river of Moravia. It passes by Olmütz, forms for some distance the boundary between Hungary and Moravia and Austria proper, and enters the Danube 7 m. above Presburg. It is navigable 50 m. from its mouth. The plain between the lower March and the Danube has often been the theater of war; here were fought the battles of Aspern and Essling and of Wagram.

March, third month of the year, consisting of thirty-one days. In the ancient Roman year it was the first month, and was so reckoned in many European countries until the adoption of the Gregorian calendar.

Marchand (mār-shān'), Jean Baptiste, 1863-; French military officer; b. Thoisy, Aisne; entered the army, 1883, and served on an expedition to the sources of the Niger, 1890. He was selected, 1896, to lead a force through the French Kongo territory to the old Bahr-el-Ghazal province of Egypt, long abandoned on account of the Mahdist revolt, take possession of it in the name of France, descend the Bahr-el-Ghazal to the Nile and the Nile to Fashoda, occupy that place, hold it against the Mahdists, and claim territorial rights for France on the Upper Nile. He established forts on the Bahr-el-Ghazal province as bases of operations on the Nile, but the British demanded that he retire from Fashoda, which he did, 1898, after negotiations between Great Britain and France, which resulted in the settlement of the controversy as to the rights of France on the Nile. France received as the price of her relinquishment of territorial claims in the Nile basin the right to use the Nile as a commercial highway and outlet from the French Kongo, and the consent of Great Britain to the extension of the French sphere of influence over the central Sudan states of Wadai, Kanem, and Bagirmi and a vast region N. in the Sahara, including the mountainous inhabited region of Tibesti.

Marchetti (mār-kēt'tā), Filippo, 1831-1902; Italian composer; b. Bologna; had his first opera, "Gentile da Varano," produced 1856; his second, "La Demente," 1857; was a singing teacher in Rome, 1860-63; became director of the Academy of Saint Cecilia in that city, 1881. His greatest work "Giulietta e Romeo" was produced at Trieste, 1865; "Ruy Blas" at Milan, 1869; later operas include "Gustavo Wasa" and "Don Giovanni d'Austria." He has also composed symphonies, chamber music, church music, and choruses.

Mar'cion, Gnostic philosopher; son of a bishop of Sinope in Pontus; was excommunicated by his father on account of his heretical views; went to Rome abt. 140; associated with the Syrian Gnostic Cerdon; formed a new Gnostic system and founded a sect, the Marcionites, which found many adherents in Syria, Egypt, and Palestine, and continued as a separate sect till the sixth century. See Gnostics.

Marcoman'ni, German tribe, first settled in the regions between the Neckar and the Main; accompanied Ariovistus when he invaded Gaul, but were later on led by their own chief, Maro-

bodius, into the land of the Boii (Bohemia), which they conquered. Maroboduus's rule was of short duration, however; he was compelled to seek refuge with the Roman emperor, Tiberius, and died at Ravenna. The Marcomanni continued, nevertheless, to be the ruling people in Bohemia. Marcus Aurelius prevented them from effecting a settlement in Italy, but not from occupying lands along the Danube, whence they made repeated incursions. Abt. 270 they invaded Italy, but with varying success. From this time their name seldom appears in history, and in the following century the traces of the tribe are lost.

Marco'ni, Guglielmo, 1875-; Italian electrical engineer; b. Marzabotto; educated at the universities of Bologna and Padua; began, 1890, experiments with wireless telegraphy which led to his ultimate success in telegraphing across the Atlantic from Poldhu, Cornwall, to St. Johns, Newfoundland, 1901; established wireless connection between Cape Breton, Canada, and Cornwall, 1902; in same year inaugurated wireless connection between Cape Cod and Cornwall, and, February 25th, while on his way to America, and 1,551 m. from Poldhu, received a wireless message from that station; inaugurated daily ocean news service on Transatlantic liners, 1904.

Mar'co Po'lo. See POLO, MARCO.

Marcou (mār-kō'), Jules, 1824-98; French geologist; b. Salins; received, 1847, employment at the museum of the Sorbonne; made extensive scientific travels in the U. S., 1848-50, 1853-54, and 1860; appointed Prof. in Geology at Zurich, 1855. As results of his explorations in the U. S., partly undertaken in connection with Agassiz, he published "Geological Map of the United States" and "Geology of North America."

Mar'cus, d. 336; Bishop of Rome; came to that dignity, 336; is said to have initiated the custom, still maintained, in virtue of which a new pope is consecrated by the Bishop of Ostia.

Marcus Aure'lius Antonin'us. See ANTONINUS.

Mar'cy, William Learned, 1786-1857; American statesman; b. Southbridge, Mass.; became a lawyer in Troy, N. Y.; served as an officer of volunteers in the War of 1812-14, capturing at St. Regis, Canada, the first prisoners and the first flag taken on land in the war; for a time conducted the *Troy Budget*, then a leading antifederalist organ; was a member of the "Albany Regency"; was made comptroller, 1823; judge of the state supreme court, 1829; and was chosen U. S. Senator, 1831, but resigned, 1833, on being elected Governor of New York, in which position he served five years. In 1839 he was appointed commissioner to adjust the Mexican claims; 1845, Pres. Polk selected him as Secretary of War; and, 1853, Pres. Pierce appointed him Secretary of State.

Marcy, Mt., called by the Indians *Taharus*, "cloud splitter"; highest land in New York

State; is in the town of Keene, Essex Co., in a cluster containing several of the highest of the Adirondacks; is 5,379 ft. high.

Mardi Gras (mărd'ê gră'), French, "fat Tuesday," formerly celebrated in England as "Shrove Tuesday," the day preceding Ash Wednesday, which is the first day of Lent. In Europe it was generally observed as a day of merrymaking, masquerades, and other features ordinarily constituting a carnival. It has survived in some of the S. cities of the U. S., notably New Orleans, where the custom was introduced abt. 1827 by creoles who had visited France. See **SHROVE TUESDAY**.

Mare Island, island in the NE. part of San Pablo Bay, near Vallejo, Solano Co., Cal., with which it is connected by ferry. It has a U. S. navy yard, sectional floating dock, and naval arsenal.

Maren'co, Leopoldo (Count), 1831- ; Italian dramatist and poet; b. Ceva, Piedmont; taught Italian literature in Bologna, 1860-64, and in Milan, 1864-71, subsequently devoting himself to a literary career at Turin. His works include the dramas "Picarda Donati," which Ristori acted; "Saffo," "Speronella," and "Giorgio Gandi," and many comedies.

Maren'go, village of Italy, province of Alessandria; famous for the battle fought here, June 14, 1800. Napoleon suddenly crossed the Alps at the Great St. Bernard, and appeared in the plains of Lombardy, in the rear of the Austrian general Melas, who, not expecting an attack from that quarter, had advanced to Genoa. Completely cut off from retreat, Melas joined battle with the French at Marengo, and suffered a crushing defeat.

Maret'zek, Max, 1821-97; American conductor, composer, and teacher; b. Brünn, Moravia; conducted the orchestra in Germany, France, and England, and was assistant to Balfe in London, 1844; removed to the U. S., 1848, and was manager of Italian opera in New York, 1849-78. He composed the operas "Hamlet" and "Sleepy Hollow," and also some chamber and orchestral music, piano pieces, and songs.

Margaret of Angoulême (ăh-gô-lăm'), also known as **MARGARET OF NAVARRE** and **MARGARET OF VALOIS**, 1492-1549; Queen of Navarre; b. Angoulême; daughter of Charles of Orleans, Count of Angoulême, and elder sister of Francis I. In 1509 she was married to Charles III, Duke of Alençon, who perished in the battle of Pavia, and, 1527, she married Henri d'Albret, Count of Bearn and King of Navarre, by whom she had one daughter, Jeanne, mother of Henry IV. At her court at Nérac she extended a large and liberal tolerance, if not sympathy, to Protestant ideas. She surrounded herself with scholars and poets, was a generous patron of art and letters, and cultivated literature industriously. Her best known work is the collection of "Contes de la Reine de Navarre," commonly

known as the "Heptameron" (stories related during seven days), stories inspired by those of Boccaccio, and cast in the same form as the "Decameron."

Margaret of Anjou (ăh-zhō'), 1429-81; Queen of England; b. Pont-a-Mousson, Lorraine; daughter of René, Count of Provence; married, 1445, Henry VI of England, and on account of his imbecility soon became the real ruler of the kingdom. The opposition of the Duke of York, claimant to the throne, gave rise to the War of the Roses, and Margaret was forced to flee to Scotland. She invaded England, killed the Duke of York at Wakefield, 1460, released her captive husband by the second battle of St. Albans, 1461; was herself defeated at Towton, and forced to flee to Scotland and France. In 1462 she made another unsuccessful invasion; in 1470, with the aid of Warwick, momentarily reinstated Henry; but in 1471 was defeated and captured at Tewkesbury, her only son, Prince Edward, being killed and the king put to death soon after. Margaret was imprisoned until 1475, when she was ransomed by Louis XI of France, at the cost of the independence of Provence, ceded by her father.

Margaret of Austria, 1460-1530; Regent of the Netherlands; daughter of Maximilian I, Emperor of Germany, and Mary of Burgundy; was affianced in infancy to the dauphin, and educated at the French court; but Charles VIII broke the contract, and returned her to her father, that he might wed Anne of Brittany; an insult never forgiven by the House of Austria. In 1497 Margaret married Prince John, heir apparent of the Spanish sovereigns Ferdinand and Isabella. John died in a few months, and, 1499, Margaret returned to the Netherlands. In 1501 she married Philibert the Fair, Duke of Savoy, who died without issue, 1504. In 1506 she was made regent of the Netherlands by her father. In connection with Louise of Savoy, mother of the king of France, she negotiated the Treaty of Cambrai, 1529, between Francis I and Charles V, called the "ladies' peace."

Margaret of Denmark, 1353-1412; Queen Regent of the three Scandinavian kingdoms; b. Copenhagen; daughter of Valdemar IV, King of Denmark; married, 1363, Hacon VIII, King of Norway. In 1375 her son Olaf succeeded his grandfather as King of Denmark, and, 1380, his father as King of Norway. During his minority Margaret conducted the government of both countries, and on Olaf's death, 1387, was chosen queen regent of both kingdoms. A large party in Sweden opposed to their king, Albert of Mecklenburg, opened negotiations with her; a Danish-Swedish army defeated Albert's German mercenaries at Falköping; the king was captured and imprisoned, and she was acknowledged Queen Regent of Sweden also. In 1397 she promulgated the so-called Union of Calmar, an act of union between the three countries, which eventually became a source of calamity. Margaret's vigorous and able rule caused her to be known as "the Semiramis of the North."

Margaret (MARGHERITA) of Italy, 1851-; Queen of Italy; b. Turin; only daughter of Prince Ferdinand of Savoy, Duke of Genoa, and Princess Elizabeth of Saxony; married, 1868, her cousin Humbert of Savoy, Prince of Piedmont; ascended the throne with him, 1878; on his death, 1900, became queen dowager. Their only son became King of Italy under the title of Victor Emanuel III. Her activity in promoting the industrial, educational, and charitable interests of the kingdom, her personal interest in the poor and afflicted, her beauty and accomplishments, caused her subjects to style her "the Star of Italy."

Margaret of Parma, 1522-86; Regent of the Netherlands; b. Brussels; daughter of Charles V by Margaret van Gheent; was married, 1536, to Alessandro of Medici, Duke of Florence (assassinated, 1537), and, 1542, to Ottavio Farnese, Duke of Parma and Piacenza, to whom she bore a son, the celebrated general, Alexander Farnese. In 1559 Philip II made her Regent of the Netherlands, which position she filled for eight years, attempting the well-nigh impossible task of reconciling the principles of Philip II and the instincts of the Dutch. She had some sympathy for the Netherlands, and, 1564, dismissed Cardinal Granvella, immediately after which her relations to Philip II became desperate. In 1567 she retired to Italy, richly endowed by the king, and not unregretted by the people.

Margaret of Scotland, Saint, 1040-93; Queen of Scotland; b. Hungary; was grand-niece of King Edward the Confessor, and daughter of Edward, son of Edmund Ironside, who was driven into exile by Canute. She resided at the English court at the time of the Norman Conquest, when she accompanied her brother, Edgar Atheling, in his flight to Scotland. In 1069 she married King Malcolm Canmore, and earned canonization, 1251, by her efforts in diffusing Christianity, and especially by connecting the Scottish with the Roman Church. She was adopted as the patron saint of Scotland, 1673.

Margaret of Valois (vål-wå'), known also as **MARGARET OF FRANCE** and **MARGARET OF NAVARRE, 1552-1615;** Queen of Navarre; b. St. Germain-en-Laye; daughter of Henry II and Catherine de Medici; was married to Henry of Navarre, afterwards Henry IV, only a week before the massacre of St. Bartholomew, 1572. While Henry fled she remained at court till 1578, when she rejoined him at Nérac. In licentiousness of character she rivaled her husband, with whom she did not long remain. After Henry's accession as Henry IV her marriage was annulled by Clement VIII, 1599. In 1605 she removed to Paris, where she cultivated the society of scholars and men of letters. She left "Letters" and "Memoirs" of considerable value.

Margari'ta, island of Venezuela; in the Caribbean Sea, 15 m. N. of the peninsula of Araya; area about 450 sq. m.; consists of two mountainous masses; the highest point, Ma-

canao, is 4,500 ft. above the sea. Only the valleys are available for agriculture; the principal industries are the fisheries and salt making. Pop. abt. 40,000.

Mar'gate, seaport town on the isle of Thanet, Kent Co., England; 74 m. E. by S. of London. Its fisheries are important, but it is best known as a fashionable watering place, much frequented during the summer. Pop. (1908) est. at 25,000.

Maria Christina (mä-rë'ä kris-të'nä), 1806-78; Queen of Spain; b. Naples, Italy; daughter of Francis I, King of the Two Sicilies; married, 1829, Ferdinand VII, King of Spain; bore him a daughter Isabella (afterwards Queen Isabella II), 1830, who, the king having abolished the Salic law of inheritance, was the rightful successor to the throne. On the king's death, 1833, a civil war broke out between the so-called Carlists, headed by Don Carlos, brother to the king and heir presumptive according to Salic law, and the "Christinos," headed by the queen. Maria Christina, who was regent during the minority of Isabella II, scandalized the progressists or radicals by her suberviency to the policy of Louis Philippe, and the people in general by her immoralities. She was compelled to abdicate, 1840, and leave the country, but returned, 1844, to be again expelled, 1854, for meddling with the government. After living in France, Italy, and England, she returned, 1864, to Spain, when, by the revolution of 1868 she was once more expelled. She returned after the accession of her grandson, Alfonso XII, to the throne, 1876.

Maria Lou'isa, 1791-1847; Empress of the French; b. Vienna; daughter of the Archduke Francis of Austria; was married, 1810, at Paris, to Napoleon I, who had obtained a divorce from his wife, the Empress Josephine, for the sake of this connection with Austria, and bore him a son, 1811. During the campaigns of 1812 and 1813 she was appointed regent. She was not allowed to follow her husband when he abdicated, and took up her residence in Schönbrunn, near Vienna. By the Peace of Paris, Parma, Piacenza, and Guastalla were given her. After the death of Napoleon she contracted a marriage with Count Niepperg.

Maria'nas, group of fifteen islands in the Pacific Ocean. They were formerly called the Ladrone Islands and belonged to Spain. The largest island, Guam, was ceded to the U. S., 1898, and the rest, together with the Caroline, and Pelew Islands were sold to Germany, 1899, for \$4,200,000. They are of volcanic origin and have a warm, healthful climate. Most of them are thickly wooded and fertile, producing coconuts, rice, corn, wheat, sugar, cotton, and tobacco. They were first discovered by Magellan, 1521, and called *Las Islas de los Ladrones* ("the thieves' islands"), on account of a strong propensity to theft observed in the natives. In 1667 the Spaniards established a regular settlement on Guam and called the islands *Marianne Islands*, after Queen Maria Anna. Area, abt. 240 sq. m. Pop. (1901) 2,132.

Mari'a There'sa, 1717-80; Archduchess of Austria, Queen of Hungary and Bohemia, and Empress of Germany; b. Vienna; daughter of the Emperor Charles VI; was declared sole heir of all the possessions of the house of Hapsburg by the Pragmatic Sanction, and married, 1736, to Francis Stephen, Grand Duke of Tuscany. On the death of her father (October 20, 1740) she ascended the throne, and appointed her husband coregent. Claims to various parts of her inheritance were raised immediately, a formidable alliance was formed against her between Spain, France, Bavaria, Saxony, and Prussia, and the Austrian War of Succession (see SUCCESSION WARS) began. The heroic resoluteness of the young empress, however, and the chivalrous enthusiasm of the Hungarian people, saved her crown, and by the Peace of Aix-la-Chapelle, 1748, she lost only Parma and Piacenza to Spain and Silesia to Prussia, while her husband was recognized as Emperor of Germany. In 1753 Prince Kaunitz became Austrian chancellor, and he succeeded in forming an alliance between Austria, France, Saxony, and Russia for the humiliation of Prussia. The Seven Years' War, although conducted by Austria with great vigor and some success, brought no result; the Peace of Hubertsburg, 1763, left Silesia a Prussian possession. On August 18, 1765, the Emperor Francis I died, and Maria Theresa took her eldest son, Joseph, as coregent. It was probably due to his influence that she participated, though not until she received the consent of the pope, in the first partition of Poland, 1772, which brought Galicia and Lodomeria under the Austrian dominion. Turkey was compelled to cede Bukowina (February 25, 1777), but the plan of annexing Bavaria was foiled, and the Austrian influence in Germany received a severe check. In the interior her government was successful and marked with great energy and wisdom. She left four sons, of whom the oldest, Joseph II, succeeded her, and six daughters, of whom the next to the youngest was Marie Antoinette.

Marie Amelie (mä-rē ä-mä-lē'), 1782-1866; Queen of the French; b. near Naples; daughter of Ferdinand I, King of the Two Sicilies, and Carolina Maria, Archduchess of Austria; married at Palermo, 1809, Louis Philippe, with whom she ascended the French throne, 1830. She was strongly imbued with the Legitimist and Ultramontane principles of her race, and deplored the revolution which made her queen, but abstained from meddling in public affairs. On February 24, 1848, she vainly attempted to dissuade her husband from abdicating. She shared his exile in England, and there, as in France, her character commanded universal respect.

Marie Antoinette (än-twä-nēt'), 1755-93; Queen of France; b. Vienna; fifth daughter of Maria Theresa and Francis I; married at Versailles, 1770, to the dauphin (afterwards Louis XVI), to whom she bore four children, of whom two died in infancy; the other two were Louis XVII and the Duchess of Angoulême. The indolence of her husband and the desperate state of affairs compelled her to med-

dle with politics. The character of Louis prevented him from following her influence, and the result was a series of half measures which became blunders, and of violence which ended in weak submission. She incurred the hatred of the people, and after the unfortunate attempt at flight, June 21, 1791, her doom was certain. In August, 1792, she was imprisoned and subjected to humiliations which were borne with heroism, as were the insults heaped on her by the Revolutionary Tribunal. Condemned to death, October 15, 1793, she was executed the following day, preserving her dignity to the last.

Marie de Medicis (dä mä-dē-sēs'), 1573-1642; Queen of France; b. Florence; daughter of Francis I, Grand Duke of Tuscany; was married, 1600, to Henry IV, King of France, to whom she bore a son, afterwards Louis XIII. She was beautiful, passionate, ambitious; Henry always avoided her; and she was not crowned till the day before his assassination, May 13, 1610. From this time she conducted the government, together with her favorites, the Concinnis, till the conspiracy of de Luynes, April 14, 1617, after which she was confined in the Castle of Blois. On the death of de Luynes, 1621, she took her place in the king's council, having been reconciled to him by Richelieu; but began intriguing against the new minister, too, and was deposed, 1630, and confined in the Castle of Compiègne. Thence she escaped, wandered in England and the Netherlands, and died at Cologne in miserable circumstances.

Marie Galante (gä-länt'), one of the French W. Indian islands; 17 m. ESE. of Guadeloupe, of which it is a political dependency; area, 63 sq. m.; principal town, Grand Bourg; chief product, sugar; important whale fisheries off the coast. Pop. abt. 17,000.

Mariet'ta, capital of Washington Co., Ohio; on the Ohio River, at the mouth of the Muskingum; 80 m. SE. of Zanesville. It is in the great oil region of Ohio and W. Virginia; is principally engaged in manufacturing and river commerce; and has flour, planing, and saw mills, carriage, tub, bucket, and chair factories; foundries and machine shops; tanneries, breweries, car shops, oil works, boat yard, and tool works. The city is the seat of Marietta College, and in the vicinity are relics of the mound builders. Pop. (1910) 12,923.

Mariette', Auguste Edouard (also known as **MARIETTE PASHA**), 1821-81; French archaeologist; b. Boulogne-sur-Mer; became professor in the college of his native place at the age of twenty. Having become interested in Egyptology, he removed to Paris, 1848, where he taught the science for two years. In 1850 he went to Egypt, and during the following thirty years devoted himself to excavations and research, working principally at Sakkarah, the Serapeum at Memphis, at Abydos, Thebes, Edfu, Denderah, and Tanis. The founding of the Egyptian Museum at Bulak (afterwards at Gizeh) was due to his efforts, and of it he was long the director, as well as inspector

general and guardian of the national monuments. Among his best known books are "The Serapeum at Memphis," "Deir et Bahari," "Karnak," "Abydos," "Denderah," "Monuments of Upper Egypt."

Mar'igold, popular name for various yellow-flowered plants, but especially for those of the genera *Tagetes* and *Calendula*, of the order *Compositæ*. The so-called African and French marigolds are of the first-mentioned genus. Both are S. American. The true marigold (*C. officinalis*), indigenous to the S. of Europe, has long been cultivated in gardens.



AMERICAN MARIGOLD.

Marines', troops enlisted for service on board men-of-war and at naval stations. Considered in the light of infantry serving afloat, marines are, as a distinct corps, coeval with navies. Among the Greeks they were known as *epibatæ*, a class described by historians as the fighting men who served exclusively on board ships of war. Though armed like the infantry on shore, they were yet distinct from the land troops, and entirely unlike the rowers or mariners who served in the fleet. The number of *epibatæ* assigned to each vessel bore about the same proportion to the crew as the number of marines to the crew of a modern man-of-war. The U. S. Marine Corps was first established by Congress, 1775, authorizing the enlistment of two battalions, to be styled "first and second battalions of marines." After the adoption of the present Constitution and the reconstruction of the navy, the Marine Corps was again called into existence, 1798, "establishing and organizing a marine corps." The Marine Corps, under the commandant, is at any time liable to do duty in the forts and garrisons of the U. S. on the seacoast or any other duty on shore, as the President or Secretary of the Navy may direct. In the World War the U. S. Marines served most gallantly and effectively at Bouresches, Belleau Wood, Chateau-Thierry, St. Mihiel, Argonne, and on the Rhine.

Marinette', capital of Marinette Co., Wis.; on Green Bay, at the mouth of the Menominee River; 49 m. N. by E. of Green Bay; has an excellent harbor, and is near large tracts of valuable hard and soft wood forests and beds of iron ore. Two bridges connect the city with Menominee, Mich. The city has a large traffic, and is principally engaged in the lumber industry and in pulp and paper making. Pop. (1910) 14,610.

Mar'inus (popes). See **MARTIN**.

Mar'io, Giuseppe (**MARQUIS DI CANDIA**), 1810-83; Italian singer; b. Cagliari, Sardinia;

made his début in Paris, 1830, under the assumed name of **MARIO**, in "Robert le Diable." He soon became the acknowledged leading tenor, and was a great favorite in England, on the Continent, and in the U. S. He married Giulia Grisi. In 1871 he retired from the stage in London.

Mariol'atry, or **Maryolatry**, worship of Mary, the mother of Jesus. The term is used without proper foundation to imply that Roman Catholics give the same worship to the Blessed Virgin Mary as to God. *Latria* is used by Catholics and orthodox Greeks only of the reverence due to God alone. The reverence accorded to the Blessed Virgin is of a vastly lower order, known as *hyperdulia*, though it is of much higher order than that given to the saints, called *dulia*. In 1854 a general council of the Roman Catholic Church defined the doctrine of the Immaculate Conception of the Blessed Virgin—that is, declared that it was of faith to believe that Mary had never borne the taint of original sin, like other children of Adam.

Mar'ion, Francia, 1732-95; American soldier; b. Winyaw, near Georgetown, S. C.; served in an expedition against the Cherokees, 1759, and was a captain in Middleton's regiment, 1761; in the Revolutionary War rose from captain of a regiment to lieutenant colonel in the Continental army (1776); took part in the defense of Fort Moultrie, the siege of Savannah, and the defense of Charleston. During the last two years of the war he carried on a partisan warfare in S. Carolina with the British, at the head of a brigade raised by himself, and by his adroitness in attack and escape became known as "the Swamp Fox"; he also took part in battles in connection with the army of Greene. After the war he served in the state senate and as general of the state militia.

Marion, capital of Grant Co., Ind.; on the Mississinewa River; 67 m. NE. of Indianapolis; has glass factories, malleable iron works, and flour and rolling mills; is the seat of a National Soldiers' Home, a state normal school, and of several sanitariums. Pop. (1910) 19,359.

Marionettes', small figures set in motion on a miniature stage by a concealed mechanism of springs and wires or cords, to represent the action of a pantomime. This amusement was known both to the Greeks and Romans; has been popular in Italy ever since the Middle Ages under the name of *fantoccini*; and was introduced into France in the time of Charles IX. In England the puppet show was common in the time of Elizabeth, and it survives in the well-known exhibitions of "Punch and Judy." It is still popular in France and Italy.

Mariottes' Law. See **BOYLE'S LAW**.

Maripo'sa Lil'ies, popular name for species of *Calochortus*, a genus of liliaceous plants, all natives of the W. U. S. and Mexico. They grow from corms, producing sparingly leafy, herbaceous stems, bearing large, showy, ter-

minal flowers, consisting of three outer narrow segments, and three inner broad ones, which are mostly glandular and bearded. Thirty-two species are known, of which *C. venustus*, *C. luteus*, and *C. pulchellus* of California, and *C. nuttallii* and *C. gunnisonii* of the Rocky Mountains are best known. Many species are



FLOWER OF *Calochortus venustus*.

cultivated in gardens in the U. S. and Europe; they are sometimes called butterfly lilies.

Maritime Law. See INTERNATIONAL LAW.

Marit'za, principal river of Rumelia, European Turkey; rises in the Balkans, flows generally SE., becomes navigable at Adrianople, and empties into the Ægean Sea at Enos.

Marius, Caius, 155-86 B.C.; Roman military officer; b. Arpinum; served under Scipio Africanus at the siege of Numantia, 134; chosen a tribune, 119; married Julia, the aunt of Julius Cæsar; was legate and second in command in the war against Jugurtha in Africa, 109; elected consul, 107, and brought the war to a close; reëlected consul, 103, 102; defeated the Teutons and Cimbri, who had invaded Italy; again elected consul, 100. At the end of the social war, 88, he obtained by violent and unconstitutional means the command of the war against Mithridates, which the Senate had already intrusted to Sulla. Sulla, who had the army at his back, forced Marius to flee for his life, and the latter took refuge in Africa. During the confusion in Rome while Sulla was absent, Marius returned and allied himself with Cinna, consul of the popular party. Together they inaugurated a reign of terror and vengeance. They were designated as consuls for 86, during which Marius died.

Marivaux (mä-rë-vô'), Pierre Carlet de Chamblain de, 1688-1763; French dramatist and novelist; b. Paris; author of the novels, "La Vie de Mariane," "Le Paysan Parvenu," etc., and of twenty-eight comedies, including "Jeu de l'Amour et du Hazard," "Les Fausses Confidences," and "L'Epreuve," which have held their place upon the stage.

Mar'joram, popular name for several aromatic herbs of the genus *Origanum*. The com-

mon marjoram (*O. vulgare*) has been naturalized in the U. S. from Europe. Its leaves are



MARJORAM.

used in cookery, and its essential oil is employed in perfumery.

Mark, standard unit of the German imperial monetary system; equal to about twenty-three cents U. S. gold.

Mark An'tony. See ANTONIUS MARCUS.

Mark, Saint, author of the second book of the New Testament; b. probably in Jerusalem; was named John, but to this was added, according to a Jewish custom of that time, the Roman surname of Mark; was, without doubt, a cousin of Barnabas the Levite; accompanied him and the Apostle Paul to Cyprus and the adjacent parts of Asia Minor; but left them and returned to Jerusalem. On his second journey St. Paul refused to have Mark for a companion, and the latter, with Barnabas, went to Cyprus and thence to other countries not mentioned in the history (Acts). Later, Mark became reconciled to St. Paul, and about the year 62 they were together in Rome. Several ancient writers attribute to Mark the foundation of the Church of Alexandria, and according to them he was its first bishop. At all events, it was from Alexandria that, in the Middle Ages, the Venetians carried his ashes and deposited them in the cathedral to which they gave his name. The Roman Catholic Church celebrates April 25th as his festival. About the *Gospel of St. Mark* the following testimonies of the Fathers are practically accepted: (1) That it was composed by the evangelist Mark; (2) that he wrote it from the narrations which he heard from the lips of Peter in the churches which he visited together with him; (3) that it was written at Rome, and on the demand of the Christians of that capital.

Mark'ham, Sir Clements Robert, 1830-1916; English geographer; b. Stillingfleet; resigned a lieutenancy in the navy, 1851; afterwards held several appointments in London; traveled extensively; was geographer to the Abyssinian

expedition; introduced the cinchona tree into India; was for many years secretary of the Royal Geographical Society and the Hakluyt Society; became president of each; knighted, 1896. His works include "Travels in Peru and India," "Quichua Grammar and Dictionary," "History of the Abyssinian Expedition," "Memoir on the Indian Surveys," "Franklin's Footsteps," a translation of the "Reports on the Conquest of Peru," "The Threshold of the Unknown Regions," "General Sketch of the History of Persia," and "History of Peru"; was also editor of the *Geographical Magazine*.

Mark Twain. See CLEMENS, SAMUEL LANGHORNE.

Marl, clay containing a large proportion of carbonate of lime, sometimes forty to fifty per cent. If the marl consists largely of shells or fragments of shells, it is called shell marl. Marl deposits are often found at the bottom of ponds, in the form of a thin white mud filled with minute, fresh-water shells of living species. Marl is a valuable fertilizer.

Marlborough, John Churchill (first Duke of), 1650-1722; British general; b. Ashe, Devonshire, England; son of Sir Winston Churchill, and at the age of sixteen was appointed ensign in the guards. He served in the force sent to aid the French in Holland, and was made colonel by Louis XIV; and on his return to England after the Peace of Nimeguen (1678) the Duke of York gave him high appointments in his household. He received military promotion; was made Lord Churchill in the peerage of Scotland; and soon after, on the marriage of the Princess Anne (1683), Lady Churchill was made chief lady of her bedchamber. When the Duke of York became James II, Churchill was made general and Baron of Sandridge, and was sent as ambassador to France. On the rebellion of the Duke of Monmouth he performed important military services, and the victory of Sedgemoor was due to him. On the landing of William of Orange, Churchill was made a lieutenant general and appointed to an important command. He soon joined William, and Lady Churchill persuaded Anne to leave London and to join the N. insurgents. The influence of the Churchills was employed to induce Anne to waive her superior claim to the throne over William. For this Lord Churchill received valuable appointments and was made Earl of Marlborough. He was sent, 1689, to command the British forces in the Low Countries, and repulsed the French at Walcourt. The next year he led an army to Ireland, and took Cork and Kinsale. He early began a correspondence with the exiled king, and completely deceived him. In 1692 he was dismissed from all his employments and for a time confined in the Tower.

When Anne became queen (1702) he was made captain general, and soon practically ruled the kingdom. As ambassador to Holland he completed the arrangements for the declaration of war against France, and was appointed generalissimo of the armies of the grand alliance, when he entered on a surprising career of victory. After various successes,

the campaign of Blenheim, in cooperation with Prince Eugene, took place in the summer of 1704, and on August 13th the battle of that name was won. He was successful in the operations of 1705, when the German emperor conferred on him the lordship of Mindelheim, with the title of prince. The battle of Ramillies was won, May 23, 1706, and other successes marked this campaign. On July 11, 1708, he won the battle of Oudenarde. Lille was taken the same year. On September 11, 1709, aided by Eugene, he won the great battle of Malplaquet. His last campaign, 1711, when he captured the fortress of Bouchain, was the most brilliant and effective of all. In the meanwhile the ministry of Godolphin was overthrown, 1710, the Duchess of Marlborough was dismissed, and Harley, as Earl of Oxford, became the head of a Tory cabinet, 1711. Marlborough was removed from all his offices, January 1, 1712. He left England at the close of that year, but returned on the day of the accession of the house of Hanover, was appointed a privy counselor, and on the arrival of George I was restored to his offices and honors. He rendered prompt service in the direction of the campaign of 1715 against the Pretender, passed the remainder of his life in quiet enjoyment of his immense wealth, died at Windsor Lodge, and was buried in Westminster Abbey.

Marlowe, Christopher, 1564-93; English dramatist; b. Canterbury; became dramatist to the Lord Admiral's Company, London; chief works "Life and Death of Dr. Faustus," "The Jew of Malta," "Edward II," first part of narrative poem "Hero and Leander"; believed by many critics the author of the second and third parts of "Henry VI," included in Shakespeare's works.

Marmont (mär-môn'), Auguste Frederic Louis Viesse de (DUKE OF RAGUSA), 1774-1852; marshal of France; b. Chatillon-sur-Seine; as aid to Napoleon served in the Egyptian campaign; made general of division after the battle of Marengo and marshal on battlefield of Znaym; lost battle of Salamanca, July 22, 1812; commanded the troops in and around Paris, 1814, and compelled Napoleon to abdicate by evacuating the capital and entering into negotiations with the allied powers. Napoleon excluded him, on his return from Elba, from the general amnesty, and he was compelled to flee, while afterwards Louis XVIII made him a peer of France and loaded him with honors.

Marmora, Sea of, body of water which separates European from Asiatic Turkey, and communicates with the Black Sea by the Strait of Constantinople, or Bosphorus, and with the Aegean Sea by the Strait of the Dardanelles; is 135 m. long and 45 m. broad. The island of Marmora; in this sea, is famous for its fine marble and alabaster.

Marmoset, name applied to various small S. American monkeys of the family *Mididae* and genera *Hapale*, *Midas*, etc. They are the nearest of all the true monkeys to the lemurine

Quadrumana. These creatures are harmless, affectionate, and often very beautiful. They



SILKY MARMOSET.

are, however, very delicate, and in cool climates soon die if exposed.

Marne (mārn), a river of France, the **MATRONA** of the ancients and the most considerable tributary of the Seine, on the right. It rises in the plateau of Langres; flows through the Departments of Marne, Haute-Marne, Aisne, and Seine-et-Marne; passes Chaumont, Joinville, St. Didier, Vitry, Chalons, Epernay, Chateau-Thierry, and Manx; and joins the Seine at Charenton, about 4 m. above Paris. It gave its name to one of the most stubbornly contested military campaigns in history. Early in the World War (Aug. 31, 1914), the Allies established a defensive line along the Marne, Seine, and Meuse for the safe-guarding of Paris. While engagements were fought at the places above named, what was termed "the battle of the Marne" took place Sept. 6-10 following, when the Germans reached the extreme point of their advance, and were driven back from the Marne to the Aisne river, where they remained practically stationary for three years on a front of 300 miles. On May 27, 1918, the Germans started another drive against the Marne defenses; June 1, they again crossed the river; July 13, they made their last attack in the vicinity of Epernay; and July 15 their advance was permanently checked, largely by U. S. forces. Marshal Joffre commanded the defense.

Marnix (mār-nēks'), **Philipp van**, theologian, diplomatist, and author; baron of Sainte-Aldegonde; b. in Brussels, 1538; was educated in Geneva under Calvin and Beza; in the Netherlands from 1560 to 1568 worked against Spanish political and religious tyranny; was exiled with William of Orange. In 1573 he was a prisoner of the Spaniards. In 1583-85 he was burgomaster of Antwerp, and it was laid to his charge that the city surrendered to the Spaniards in the latter year without stipulating for religious liberty. During the rest of his life he lived quietly upon his estates. He died in Leyden, December 15, 1508, whither he had gone to superintend a translation of the Bible into Dutch.

Maroc'co. See **MOROCCO**.

Marochetti (mā-rō-kēt'tē), **Carlo** (Baron), 1805-67; Italian sculptor; b. Turin; naturalized and educated in France; exhibited, 1829, in Paris a group, "A Girl Playing with a Dog," which attracted much attention; after 1848 removed to London, where he died. His principal works are an equestrian statue of Emmanuel Philibert at Turin, a colossal statue of Richard Cœur de Lion in London, besides busts and statues of Prince Albert, the queen, the Duke of Wellington, etc., and the tomb of Napoleon in the Invalides.

Maroni (mā-rō-nē'), river of Guiana, separating the Dutch from the French colony; rises in the highlands near the frontiers of Brazil, takes a general N. course and empties into the Atlantic after a course of about 425 m. Seagoing vessels can ascend to the Armina fall, 50 m. from the mouth, and above that there are considerable stretches of navigable water.

Mar'onites, Christian people of Syria who take their name from their first monothelitic bishop. John Maron or Maro, who died 701 A.D. Their number is estimated at from 200,000 to 250,000. They live chiefly in the N. part of the Lebanon, but are found also all over the Lebanon and the Anti-Lebanon, with a few in the larger cities of Syria. They are Roman Catholics of the Syrian rite. They have a patriarch who lives at Canubin, a monastery near the foot of Lebanon, but who bears, in common with five other dignitaries, the title of Patriarch of Antioch. They have also metropolitans of Tyre, Damascus, Aleppo, Tripoli, and Cyprus, besides seven bishops. They were anciently monothelites, but having joined in the second crusade against the Saracens, 1182, renounced their heresy before the Latin Patriarch of Antioch, Aimeric III. In 1445 they were more formally united to the Roman Catholic Church. They are hospitable toward all Christians; speak Arabic or Greek; consider the Syriac their sacred language; and make use of Syro-Chaldean books.

Maroons', name formerly used in Jamaica for runaway slaves and their descendants. It has been applied to a similar class in Guiana, where, however, they are generally known as bush negroes.

Maros (mōr-ōsh'), river of Europe which rises in Transylvania, near the frontier of Moldavia, flows in a W. direction into Hungary, and joins the Theiss opposite Szegedin, after a course of about 400 m., for the greater part of which it is navigable.

Marot (mā-rō'), **Clément**, 1495-1544; French poet; b. Cahors. At the age of ten was taken to Paris; studied law, but soon became page to Nicolas de Neuville, Seigneur de Villeroy. In 1515 dedicated an allegorical poem, "Temple de Cupidon," to Francis I, and thereupon was attached to the suite of his sister, Marguerite d'Angoulême, 1519. Took part in the battle of Pavia, 1525; was wounded and taken prisoner. Soon released, returned to France, fell under suspicion of holding Protestant opinions,

and was thrown into the Châtelet. By intervention of Bishop of Chartres was transferred to Chartres. While here composed "L'Enfer," a satire on his imprisonment in the Châtelet. Set at liberty by Francis I, 1527, but was soon in prison for aiding the escape of a prisoner; a poem to the king again freed him. Became *valet de chambre* of the king on the death of his father. Published "Adolescence Clémentine," followed the next year by a second. His relations with Protestants subjected him again to suspicion of heresy; fled to the court of his patroness, Marguerite, now Queen of Navarre, 1534, then crossed into Italy. He returned to Lyons, 1536, and again enjoyed court favor till 1543, when his translation of the first fifty Psalms, at first encouraged by Francis I, was condemned by the Sorbonne; Beza completed his translation, and issued it in the French Protestant churches. He fled to Geneva, and then to Gurin, where he died.

Marque (märk), Let'ters of, in international law, the consent of a government, expressed in a formal permission, that a certain vessel may act as a privateer when the requisite bonds and formalities have been given or complied with. The words are explained best by the French *lettres de marque*—i.e., of stamp, or stamped letters, like *lettres de cachet*, letters of seal, or sealed with the king's signet, but specially giving authority to arrest. They are, then, stamped letters allowing reprisals or private warfare. See PRIVATEER.

Marquesas (mär-kä'säs) Is'lands, or *Mendana Archipel'ago*, archipelago in E. Oceania, belonging to France since 1842; consisting of twelve islands; total area, 480 sq. m.; pop. 3,424. The largest island is Nukahiva; area, 186 sq. m.; greatest elevation (and highest in the group), 3,840 ft. The second in size is Hivaoa; area, 155 sq. m.; is the most densely populated. Only six of the islands are inhabited. They are all mountainous, with great depths of water close to them, and poor harbors. The climate is warm and humid, but not unhealthful. The inhabitants are closely allied to the Tahitans, and have the reputation of having the finest physical forms known. Tattooing is universally practiced. Cannibalism was practiced as late as 1867. They profess Roman Catholicism almost universally. The SE. islands were discovered by Mendana, 1595, and Capt. Cook touched there on his second voyage, 1772. The NW. islands, which are somewhat separated and are sometimes called Washington Islands, were discovered, 1791, by Capt. Ingraham, of the U. S.

Marquette (mär-kët'), Jacques, 1637-75; French missionary; b. Laon; sailed, 1666, as a Jesuit missionary to Canada; founded the mission of Sault Ste. Marie, 1668; went, 1669, from La Pointe du Saint Esprit (now in Michigan) to Mackinaw, where, 1671, he built a chapel; accompanied Joliet in his expedition of 1673 down the Wisconsin and Mississippi, and returned via the Illinois River and Green Bay, Wis.; opened, 1675, the mission at Kaskaskia, but, finding his strength failing, set out to return to Mackinaw, and died on the

journey near the mouth of Marquette River, in what is now Michigan.

Marquis, or *Mar'quess*, British title of nobility, next in rank below that of duke, and next above that of earl. Like the ancient English title of *lord marcher* and the German one of *Markgraf*, it originally signified an officer who governed a mark or frontier district. As an honorary title it was first bestowed in England, 1386. A marquis is addressed as "the most honorable." The title of his wife is "marchioness," and she is also addressed as "most honorable," or as "your ladyship."

Marriage, in law, the conjugal union of one man with one woman. In Christian communities the marriage relation is considered the most solemn of contracts; and, excepting in Protestant countries, it is regarded as a sacrament. In England, although not a sacrament of the Church, it is not only celebrated as a religious ceremony, but until very recently it fell almost exclusively under the cognizance of the ecclesiastical courts. In the U. S. marriage is, by law, only a civil contract; magistrates, equally with clergymen, have a right to solemnize it; but it is the prevailing practice to have it performed by a clergyman, with religious ceremonies. One grave question remains in a state of singular uncertainty; it is: What is necessary to constitute a complete and valid marriage? or rather, are the ceremonies and forms, or any of them, which are indicated by law or are customarily used for the solemnization of marriage, indispensable, or is the mere consent of the parties sufficient? When this question of the validity of marriage by mere consent was argued in England before the lords, the six law peers were equally divided, Lords Brougham, Denman, and Campbell being in favor of the validity of the marriage at common law, and Lords Lyndhurst, Cottenham, and Abinger against it.

Almost at the same time the same question came before the Supreme Court of the U. S., and Chief Justice Taney, in deciding the case (on other grounds), said: "Upon this point the court is equally divided, and no opinion can be given." Nevertheless, the tendency of American decisions favors the conclusion reached by Chancellor Walworth (*Rose vs. Clark*, 8 Paige, 574), "that any mutual agreement between the parties to be husband and wife in *presenti*, especially where it is followed by cohabitation, constitutes a valid and binding marriage, if there is no legal disability on the part of either to contract matrimony." Contracts to marry at a future time are recognized by law. The promises must be reciprocal, and the action may be brought by an infant, but not against one. Direct testimony to the promise is not demanded. The defense most usually relied on is a denial of the promise; and after that, the bad character of the plaintiff, which, if made out, is a sufficient defense. Contracts in restraint of marriage are wholly void, by the policy of the law. The matrimonial connection in modern times called "a marriage of conscience," which ancient jurists termed *semimatrimonium*, was discountenanced by the Roman Catho-

lic Church, but was considered to be a real marriage. It is still called in Germany *Halbehe*, where the name of half wife, *Halbweib*, is bestowed on a woman to whom, though a real wife, the husband does not convey his rank. See DIVORCE.

Marriage Settlement, or **Antenuptial Settlement**, contract, made in contemplation of marriage, by virtue of which property contributed by or on behalf of the parties to the intended marriage is settled on those parties in accordance with the terms of a conveyance or trust deed then entered into. Such settlements usually provide for the payment of the income of the property contributed by or on behalf of the husband to him for life, and the income of the property contributed by or on behalf of the wife to her for life; and after the death of either of them for the payment of the income of the entire property to the survivor for life or until remarriage, and in case of the remarriage or death of the surviving party, for the division of the funds among the children or issue of the marriage, according to the terms specified.

Marrow, also called **MEDULLA**, soft, translucent, yellowish or reddish substance, found in the central cavities and in the spongy texture of the bones of man and the higher animals. There are two varieties of marrow, the yellow and the red. The former fills the interior of the shafts of long round bones, and consists principally of fat with a few capillary blood vessels; the latter occupies the spongy texture of bones, and consists of much less fat with more capillary blood vessels.

Marryat, Frederick, 1792-1848; English novelist; b. London; entered the British navy, 1812, as a midshipman; took part in many naval engagements with the French, gaining great credit by rescuing drowning shipmates on more than one occasion; served on the American squadron, 1812-15; was engaged in the action on Lake Pontchartrain, 1814. Having attained the rank of captain and the command of a vessel in the Channel squadron, he began, 1829, the publication of a series of nautical romances which proved a brilliant success. He wrote in all twenty-four novels; "*Snarley-yow*" is generally considered the best. He was also the author of a "*Code of Signals for Vessels Employed in the Merchant Service*," of "*A Diary in America, with Remarks on its Institutions*," and of numerous miscellaneous works.

Mars, Anne François Hippolyte Boutet-Monvel, 1779-1847; French actress; b. Paris, February 5, 1779; daughter of Jacques Monvel; entered very early on the stage; made, 1800, a great impression by her presentation of the deaf and dumb girl in "*l'Abbé de l'Épée*"; was soon acknowledged as the greatest actress ever seen in certain rôles, the so-called *grandes coquettes*, *Agnès*, *Célimène*, *El-*

mire, etc.; achieved a triumph by her impersonation of *Gabrielle de Belle-Isle*, a girl of twenty, herself being sixty; retired, 1841, honored, admired, and rich.

Mars, one of the principal gods among the ancient Italians, was worshiped at Rome under three aspects: First, as *Mars Gradivus* he was the god of battle, early identified with the Greek *Ares*, son of Zeus and Hera, and more famous as the lover of Venus (*Aphrodite*) than as a war god, a character very different from that of the Italian Mars; secondly, as *Silvanus* he was the god of husbandry and rural life; lastly, as *Quirinus* he was the father and tutelary divinity of the Roman state, whose founders were his offspring. The most important and most sacred celebrations in his honor took place in the month of March, and were performed especially in the sacred field of Mars (*Campus Martius*) between the city and the Tiber on the N. From the time of Augustus, who founded the magnificent Temple of Mars in the Forum Augusti, he was worshiped as the avenger of the murder of Cæsar. The symbols or characteristic attributes of Mars were the wolf, the woodpecker, and the spear. See **ARES**.

Mars, nearest of the superior planets, his orbit being next outside that of the earth, and the fourth in order of distance from the sun. There is no planet which can be studied under such favorable circumstances as Mars; accord-



THE PLANET MARS AND THE ORBITS OF ITS TWO MOONS
(OR SATELLITES).

ingly, ever since the invention of the telescope, Mars has been a favorite object of observation. So far back as 1643 Fontana, of Naples, detected spots on the surface of Mars, and suspected the planet's rotation. Cassini's more trustworthy observations were commenced, 1686, in Bologna. In about a month he had satisfied himself that the planet rotates on its axis once in twenty-four hours forty minutes. Astronomers at Rome, however, assigned a rotation period of only thirteen hours, which Cassini explained by showing that they had mistaken two opposite faces of the planet for one and the same aspect. The period of rotation of Mars on its axis is now fixed at twenty-four hours, thirty-seven minutes, twenty-three seconds.

Among the markings of Mars, a whiteness around the S. pole of the planet had been

already noticed for sixty years when Maraldi first paid special attention to the peculiarity. He found that the outskirts of this white region were subject to notable variations, and even while his observations were in progress the fainter portion of the spot disappeared. At this time the N. polar regions had not been carefully examined, being, in fact, only brought favorably into view, as regards the position of the polar axis, when Mars is near his aphelion, but Sir W. Herschel, whose powerful telescope enabled him to disregard the planet's changes of opposition distance, detected a similar whiteness around the N. pole of the planet. He was soon led to ascribe the peculiarity to the probable existence of ice and snow around the polar regions of Mars. Mars has two small satellites.

In 1877 Schiaparelli, at Milan, thought that he detected a network of fine lines, which he called canals, passing over the equatorial regions of the planet. These "canals" have since been the subject of much speculation among astronomers. They must be at least 60 m. wide, and their nature is an open question. Prof. Pickering, of Harvard, has propounded the theory that these canals are not artificial at all, but are the results of the planet's natural shrinkage, a view which Prof. A. S. Eddington, Chief Assistant Astronomer Royal, says British astronomers are most inclined to accept. The habitability of Mars is another open question, on which many theories have been advanced. In 1907 Prof. Percival Lowell, in a communication to *Nature*, of London, declared that the planet is at present the abode of intelligent, constructive life; that his photographic plates showed fifty-six canals; and that the equatorial canals are steadily fading out. His photographs showed with striking clearness the N. and S. ice caps and the various canals previously unknown in Europe.

Marsala, maritime town of Sicily; province of Trapani; about 19 m. SSW. of the port of Trapani; is well built and well fortified, and its public edifices contain many objects of historic and artistic interest. Marsala occupies nearly the site of the old Carthaginian *Lilydæum*, and here are curiously painted sepulchers cut in the solid rock, the ancient Grotto of the Sibyl with its prophetic well, rare old mosaics, etc., which may be seen outside the W. gate. Pop. of commune (1901) 57,567.

Marsden, Samuel, 1764-1838; English missionary; b. Horsforth, near Leeds; went, 1794, as Anglican chaplain to the recently established penal colony at Parramatta, near Sydney, Australia. After a visit to England he purchased a small vessel, at his own expense, and went to New Zealand, where he was well received by the natives. Marsden continued to reside in Australia, but visited New Zealand at intervals; in time persuaded the natives to adopt a fixed form of government, provided for the preparation of a grammar and dictionary of the Maori language, and lived to see the islanders generally Christianized, and himself to be regarded as the "apostle of New Zealand."

Marsden, William, 1754-1836; British Orientalist; b. Dublin, Ireland; entered, 1771, the civil service of the E. India Company at Bencoolen, Sumatra; became principal secretary to the colonial government; studied the Malay language and literature; returned to England, 1779; published a "History of Sumatra," a "Grammar and Dictionary of the Malay Language," a translation of "Travels of Marco Polo," and "Numismata Orientalia." He presented his fine collection of coins and medals to the British Museum, and his Oriental library to King's College, London.

Marseillaise (mār-sā-yāz'), most popular national song of France, called after the "confederates" of Marseilles who aided Barbaroux in the Paris insurrection of August 10, 1792. Originally it was known as the "Chant de guerre de l'armée du Rhin," from the fact that Rouget de l'Isle, who produced it, 1792, was then stationed at Strassburg. It is now generally believed that it was heard in that city ten years earlier, and that he copied the melody from the *credo* of the fourth mass of Holtzmann of Mursburg, who composed it, 1776.

Marseilles (mār-sāl'), ancient *Massilia*; principal seaport of France and capital of the department of Bouches-du-Rhône; on the Gulf of Lyons; 400 m. SSE. of Paris. The old part of the city consists mostly of narrow and crooked streets, with a few spacious squares, and is separated from the new part, with its broad, straight streets and magnificent quays along the harbors, by an elegant avenue running from the Porte d'Aix, a fine triumphal arch at the N. entrance of the city, to the Porte de Rome, which to the S. leads into the Prado, the principal promenade. The most elegant part of the new city is the Cannebière, a street running from the above-mentioned avenue to the old harbor, and containing, besides several public buildings, the most prominent hotels and the most brilliant shops. The liveliest and most characteristic part of Marseilles is the quays, thronged with people from Algeria, Egypt, Syria, and all parts of Europe.

Of the public buildings, the most remarkable are the cathedral, in the old town, on the site of an ancient temple of Diana, and the town house, the Bourse, and the mint in the new town. The whole city presents a picturesque aspect, rising amphitheatrically around the bay, and surrounded with hills covered with olive groves, vineyards, and elegant villas. The educational and benevolent institutions are numerous. The manufacturing industry is very flourishing, especially of soap, leather, glass, porcelain, liqueurs, etc. Its principal importance the city derives from its commerce. The old harbor comprises a basin 1,000 yds. long, 330 yds. broad, from 18 to 24 ft. deep, covering an area of 70 acres, and capable of accommodating about 1,200 merchant vessels; it is defended by Fort St. Nicholas and Fort St. Jean. The new harbor, La Joliette, formed by a breakwater 1,300 yds. long, was opened, 1855. Still more recently the basin called Dieu-Donné, admitting the largest men-of-war, was

formed between the islands of Ratonneau and Pomégue, both fortified. Four lighthouses show the way into the harbors.

Marseilles was founded in the sixth century B.C. by Phocæans from Asia Minor. In 49 B.C. it was conquered by Cæsar and united to the Roman republic; Cicero calls it at this time the Athens of Gaul. In the ninth century of our era it belonged to Burgundy, in the thirteenth to Provence; in 1481 it was united to France. During the revolution it suffered severely from Fréron's atrocities, but it rose rapidly after the restoration, and the conquest of Algeria by the French gave its commerce a powerful impulse. Pop. (1911) 550,619.

Marsh, Dexter, 1806-53; American palæontologist; b. Montague, Mass.; was an uneducated day laborer; at his death his was perhaps the choicest collection of fossil footprints and fishes then in existence.

Mar'shal, originally the person who had charge of the king's horses. When chivalry became the only important secular pursuit, the marshal's position was one of great importance, and finally in England there was appointed an earl marshal, who at present has only a ceremonial dignity, except as the head of the College of Heralds. The office is hereditary with the dukes of Norfolk. The highest military title in most European armies is marshal. In the U. S. a marshal is an officer of the U. S. courts, whose duties correspond to those of the sheriffs of the state governments.

Marshall, John, 1755-1835; American jurist; b. Germantown, Va.; son of Col. Thomas Marshall, later of the Revolutionary army; joined the Colonial army, 1775, and till 1779 was an officer in active service, and often acted as judge advocate in courts-martial; was licensed to practice law, 1780, and settled in Richmond, 1783; was elected to the legislature, and, 1788, to the Virginia convention for ratifying the U. S. Constitution, the adoption of which was due to the arguments of James Madison and himself. He went, 1798, with Pinckney and Gerry as envoy to France; entered Congress, 1799, where he was one of the ablest Federalists in the House; was appointed, 1800, Secretary of War, and soon after Secretary of State; was Chief Justice of the U. S. after 1801; author of a "Life of Washington" and "History of the Colonies."

Marshall, Thomas Riley, 1854- ; American statesman; b. New Manchester, Ind.; graduated from Wabash College, 1873, and admitted to the bar, 1875; practiced law at Columbia City, Ind., 1875-1909; elected Governor of Indiana, 1909, and Vice-President of the U. S., 1912 and 1916.

Marshall Archipel'ago, large group of coral islands in Micronesia, between the parallels 5° and 12° N. and the meridians 160° and 175° E.; consisting of innumerable islets, in two principal ranges, running SE. and NW. The E. is called the Ratak group and the W. the Ralik group. They have belonged to Germany since 1885. Pop. (1907) abt. 15,000.

Mar'shalsea Pri'son, prison in Southwark, London; built in the twelfth century, and placed under the control of the king's marshal of the household. It was long a King's Bench prison, but, like the Fleet, became a poor debtor's prison. It was abolished, with the ancient Marshalsea, 1849.

Marsh Gas, light carbureted hydrogen, methane, fire damp; a gas of the composition CH₄, which is formed in nature under a variety of conditions. The name marsh gas is given to it because it is formed in marshes. Wherever vegetable matter undergoes decomposition without free access of air, as under water, the carbon and hydrogen combine to some extent in the form of marsh gas. The gas seen arising in the form of bubbles from a pool of stagnant water always contains the gas, mixed generally with other gases. It is found in the gases of the alimentary canal of human beings, and in enormous quantities in some coal mines, where it issues from crevices in the earth. Further, it is a constituent of natural gas. It is formed when organic matter is heated without access of air, as in the destructive distillation of coal in the manufacture of illuminating gas. Mixed with air it is highly explosive, and is the cause of many of the explosions in coal mines.

Marsh Hawk, or **Har'rier**, common name in the U. S. for the *Circus hudsonius*, a large and rapacious bird found in all parts of N. America. The marsh hawk of Europe and Africa is *C. cyaneus*.

Marsh Hen, name applied to the clapper rail, called also salt-water marsh hen (*Rallus crepitans*), and to the *R. elegans* (fresh-water marsh hen, king rail), game birds of the U. S.

Mars Hill. See AREOPAGUS.

Marsh Mal'low, herb of the mallow family, the *Aithæa officinalis*, a native of the Old World, but naturalized in the U. S., principally in salt marshes. The plant is remarkably gummy, and is used as a medicine in coughs and diseases of the bowels and kidneys; also, in confectionery.

Marsh Rose'mary, or **Sea Lav'ender**, salt marsh plant, the *Statice limonium*, common along the Atlantic shores of the U. S., Canada, and Europe. There are many varieties, by some botanists regarded as one species. Its root abounds in tannic acid.

Marsh Trefoil. See BUCK BEAN.

Mars la Tour (mārs' lā-tōr'), village on the road from Metz to Verdun; 10 m. W. of Metz; noted for the battle which took place here August 16, 1870, and which is often called after this place, though generally after Vionville, a village situated farther to the E. and nearer the center of the battle. Prince Frederick Charles achieved a great strategical victory over Bazaine, who by this defeat was prevented from leaving Metz. The German losses were estimated at 640 officers and 15,170 men; the French, at 879 officers and 16,128 men.

Mar'ston, Philip Bourke, 1850-87; English poet; b. London; son of John Westland Mar-

ton, playwright and novelist; was blind from early childhood; was the subject of Hake's poem "The Blind Boy" and of Mrs. Craik's "Philip, My King." His publications include "Song Tide," "All in All," "Wind Voices," "For a Song's Sake," "Garden Secrets."

Marston Moor, open plain, 8 m. from York, England, memorable as the scene of the victory gained, July 2, 1644, by the allied Parliamentary and Scotch armies, commanded, respectively, by Lord Fairfax and the Earl of Leven, over the royal forces under Prince Rupert. Leslie's Scotch regiments and Cromwell's brigade of "Ironsides" captured the enemy's artillery, taking 1,500 prisoners and 100 colors. Four thousand royalists were killed. The result was the surrender of York to Lord Fairfax a few days later, which made the Parliamentary cause triumphant throughout the N. of England.

Mar'strand, Vilhelm Nicolai, 1810-73; Danish painter; b. Copenhagen. His works are exceedingly numerous and all excellent. With the exception of Thorwaldsen, he is the greatest artist that Denmark has produced.

Marsupialia (mār-sū-pī-ā'li-ā), order of mammals, all, with the exception of the American opossums, now confined to Australia and its archipelago. The name is derived from the presence of a *marsupium* or abdominal pouch in the females for the protection of their immature young, supported by two supplementary bones attached to the front of the pelvis. They have been divided into two sections, according to the character of their food—the plant-eating and the carnivorous and insectivorous groups. The former includes the wombats, the kangaroos, and the phalangers and koala; the latter, the bandicoots, the opossums, the Australian anteaters, and the dasyures and phascogale. Though Australia is the great headquarters of the marsupials, they are found in America from the middle U. S. to Buenos Ayres, as well as on the W. coast of S. America. See KANGAROO.

Mar'syas, in Greek mythology, according to different traditions, a satyr or a peasant of Phrygia. Becoming possessed of a flute which Minerva had thrown away because it distorted her features playing it, and which was still under the influence of her breath, he challenged Apollo to a musical contest, and played the flute while Apollo played the lyre. Apollo triumphed by the aid of his voice. The condition was that the victor should do what he pleased with the vanquished, and Marsyas was bound to a tree and flayed alive. His blood was the source of the Marsyas River, in Phrygia, an affluent of the Meander.

Martel', Charles. See CHARLES MARTEL.

Martello Tower, round tower, abt. 30 ft. high, with walls 5 or 6 ft. thick. The cellar and lower floor contain ammunition and supplies, the second and third living rooms and armory for the garrison, and the vaulted roof is provided with a parapet and mounts one or more guns. The entrance is on the second floor by a ladder or drawbridge. In the U. S. Tower Dupré, Louisiana, and the tower on

Tybee Island, Ga., belong to this class of defensive works.

Mar'ten, name of several carnivorous furbearing animals of the family *Mustelidæ*. In N. America is found the Hudson Bay sable or pine marten (*Mustela americana*), which produces a valuable fur, inferior in value to that of the Russian sable only. The latter animal



PINE MARTEN.

(*M. zibellina*) is caught in Siberia. The pine marten of Europe (*M. martes*) and the stone marten or common European marten (*M. foina*) produce great quantities of cheap and useful fur. Martens are lithe, active creatures, with long bodies and very short legs; the claws are long and sharp, the tail bushy. Their movements are graceful, and they are expert in climbing trees.

Mar'tha's Vine'yard, principal island of Dukes Co., Mass., in the Atlantic; is 19 m. long, averages 5 m. in breadth, is rather level, and contains the towns of Edgartown, Chilmark, Tisbury, Gay Head, and Cottage City. The latter was for many years a noted camp-meeting ground.

Marti', José Julian, 1853-95; Cuban patriot; b. Havana; forced to work in the quarries as a convict, 1868, and afterwards sent to Spain; became a lawyer, 1876. He demanded independence for Cuba, and was twice imprisoned in Spain as a rebel, but escaped each time; was for a short time Prof. of Philosophy and Literature in the Univ. of Guatemala; was consul in New York for Uruguay, Paraguay, and the Argentine Republic, and a member of the Pan-American Congress held in Washington; killed in battle at Dos Rios, Cuba.

Martia'lis, Marcus Valerius, abt. 40-abt. 104; poet; b. at Bilbilis, Spain; went during the reign of Nero (in 64) to Rome, where he resided for thirty-four years, and achieved a great literary fame. He returned in 98 to his native city, where he seems to have died a few years afterwards, not later than 104. Of his works, fifteen books, containing about 1,500 small poems, *epigrammata*, are still extant, all distinguished by cutting wit, an elegant and pointed form, a high degree of felicity of expression, and very interesting for the moral study of the time to which they belong, but sometimes revealing an offensive sensuality and a talent for flattery of a very doubtful character.

Martial Law, law administered by the military power over a district or country in which the civil authority has been superseded by, or made subordinate to, the military for the purpose of subduing invasion or insurrection by opposing forces, or of restoring to power the civil courts in case of their inability to secure the administration of justice. It differs widely from "military law" and "military government." *Military law* is a department of the municipal law prescribing the code of rules for the regulation of the army and navy alone, either in war or in peace; and in the U. S. it is enacted by Congress in the same manner and with the same force and effect as any other legislation, and civilians are expressly exempt from its operation. *Military government* is the government which the commander of an invading army exercises for the time being over a conquered country. Martial law can exist only in time of war or when the civil authorities are rendered powerless to enforce the laws of the land by the presence of hostile or rebellious forces, and it applies to civilians as well as to the military, and, unlike military government, is established only over those districts or territories which are friendly in fact or in contemplation of law. See **HABEAS CORPUS**.

Martin, name of five popes of Rome, the most important of whom follow: **MARTIN I**, d. 655; saint; b. Todi, Umbria; succeeded Theodore I, 649; called the first Lateran Council, 649, which affirmed the doctrine of two wills and operations in Christ. The Emperor Constant II, an upholder of the doctrines condemned by the council, had the pope arrested, 654, on a false charge of treason, and taken to Constantinople, whence he was banished to Cherson in the Crimea, where he died. Day, November 12th. **MARTIN IV** (**SIMON DE LA BRIE**), d. 1285; b. Touraine, France, of humble patronage; became a Franciscan at Tours; was patronized by St. Louis; became a cardinal, 1262; was long papal legate at Paris. He succeeded Nicholas III, 1281. The Sicilian Vespers soon followed, 1282, and he excommunicated the enemies of the French, thereby greatly weakening his own cause in Italy; succeeded by Honorius IV. **MARTIN V** (**OTHO COLONNA**), 1363-1431; pope; b. Rome; became auditor of the rota, 1394; cardinal deacon, 1405; was chosen pope by the Council of Constance, 1417, in place of John XXIII; overcame the reform movements begun at the Council of Florence; healed the divisions of the Church; pacificated Europe; and advanced the cause of learning; succeeded by Eugene IV.

Martin, Bon Louis Henri, 1810-83; French historian; b. St.-Quentin; became a Senator, 1876, and member of the Academy, 1878; was for a short time, 1848, Provisional Minister of Public Instruction; author of "History of France," crowned by the Academy; "France and Italian Unity," "Genius and Destiny of France," "Studies in Celtic Archeology," "The Napoleons and the Frontiers of France," etc.

Martin, Henry Newell, 1848-96; British biologist; b. Newry, Ireland; became Lecturer on Natural History at Cambridge Univ., 1874;

Prof. of Biology and director of the biological laboratory at Johns Hopkins Univ., 1876-93; was Croonian lecturer of the Royal Society of London, 1883. He collaborated with Thomas H. Huxley in the preparation of "Practical Biology," and published important works on that branch of science.

Martin, Louis, 1846-1906; general of the Society of Jesus; b. near Burgos, Spain; entered the Jesuit novitiate, 1868; was made rector of the Univ. of Salamanca, 1878, and provincial of the Jesuit order in Castile, 1886. In 1892 he was chosen general of the order. He was brought into especial prominence by his opposition to the Americanization of the Roman Catholic Church in the U. S., and was popularly known as "the Black Pope."

Martin, Saint, abt. 316-400; Bishop of Tours and patron saint of France; b. Pannonia; left the army, 338; became a monk; was associated with St. Hilary of Poitiers; was elected Bishop of Tours, 371. The unwearied labors of Martin and his followers caused him to be looked upon as the second apostle of Gaul. His feast is celebrated on November 11th, hence called "Martinmas."

Martin, Sir Theodore, 1816-1909; Scottish author; b. Edinburgh; was a solicitor there till 1845, when he removed to London; was a parliamentary agent in the passing of private bills, etc., for over sixty years; married Helena Faucit, prominent as an actress, 1851; was elected rector of St. Andrew's Univ., 1880; knighted, 1880. He wrote verses for magazines under the signature of "Bon Gaultier"; published "The Book of Ballads" in conjunction with Prof. Aytoun; made many translations, including Dante's "Vita Nuova" and Goethe's "Faust"; also wrote a "Life of the Prince Consort," "Madonna Pia, and Other Plays," etc.

Martin, name given to several birds of the swallow family (*Hirundinidae*). The purple



MARTIN (*Progne purpurea*).

1. Female. 2. Male.

martin of the U. S. (*Progne subis*), so called from the lustrous purplish-blue color of the

male, is the largest of the N. American swallows. It often inhabits boxes put up near houses, and is a popular favorite. It ranges from the frontier of Patagonia to within the Arctic Circle. The house martin of Europe (*Chelidon urbica*) frequently attaches its nest to the walls of houses even in towns. The sand martin (*Cotile riparia*) of Europe and N. America is smaller, of a dull color, and builds its nest at the end of a long horizontal gallery, which it bores in some natural or artificial escarpment.

Martineau (mār'ti-nō), Harriet, 1802-76; English author; b. Norwich; sister of James Martineau; engaged in literary work, 1823; lived in London, Tynemouth, and Ambleside; spent 1834-35 in the U. S.; and traveled in Palestine and the East, 1846; works include "Society in America," "Eastern Life, Past and Present," "History of England During the Thirty Years' Peace," "Biographical Sketches," and novels and tales, "Deerbrook," "The Hour and the Man," "Mary Campbell," and "My Servant Rachel."

Martineau, James, 1805-1900; English theologian; b. Norwich, of Huguenot extraction; was minister of Unitarian societies in Dublin and Liverpool; became Prof. of Moral and Metaphysical Philosophy in Manchester New College, and removed to London when it was transferred thither, 1858; was also joint pastor of the Unitarian Chapel, in Little Portland Street, and later sole incumbent, resigning 1874; was principal of the college, 1868-85. His works include "The Rationale of Religious Inquiry," "Endeavors After the Christian Life," "Religion and Modern Materialism," "Types of Ethical Theory," "The Seat of Authority in Religion," "Study of Spinoza."

Martinez (mār-tē'nēth) Cam'pos, Arsenio, 1834-1900; Spanish military officer and politician; b. Segovia; fought under O'Donnell in Africa and under Prim in Mexico; served against the revolutionists in Cuba, 1869-72, and soon after his return was made captain general of Valencia; for his services against the Carlists he was promoted to lieutenant general. The final downfall of the Carlists was mainly due to his victory at Pena de Plata, 1876. From 1876 to 1878 he was captain general of Cuba, and during this period he extinguished the rebellion in that island, more by conciliation than by arms. In 1889 he was Minister of War. On February 8, 1881, he combined with Sagasta to form a new ministry, taking the presidentship of the council and the portfolio of war; and he retained the latter position in the Cabinet of January 9, 1883, finally resigning January 18, 1884; took command of the Army of the North, and commanded the army sent against the Riffs, 1894, when that tribe attacked Melilla. He was again Captain General of Cuba, 1895-96; became President of the Senate, 1899; was considered the most humane Spanish general of his day; worried greatly over refusal of the Cortes to confirm his conciliatory pledges to the Cubans, 1877.

Martinez de la Ro'sa, Francisco, 1789-1862; Spanish statesman and writer; b. Granada; be-

came Prof. of Philosophy at Granada, 1808; was Deputy from Granada, 1813, and the Cortes employed him for a time as an agent in London; having become a Constitutionalist, he was imprisoned after the return of Ferdinand VII, and was banished to the penal settlement of Gomera, Africa, whence, after the uprising of 1820, he was recalled, to become for a time Minister of Foreign Affairs. On the subversion of the Constitution, 1823, he went into exile; in 1834 again became Minister of Foreign Affairs, as leader of the Moderate party; in 1858 became the leader of the ministry; in 1860, President of the Senate. His works include an epic, "Zaragoza," the tragedies "Morayma" and "Oedipus," the comedy "The Girl at Home and the Mother at the Masquerade," the romance "Isabel de Solis," and the historical work "The Spirit of the Age."

Martinique (mār-ti-nēk'), island of the Lesser Antilles, W. Indies, belonging to France; lying between the two British islands of Dominica and St. Lucia, 25 m. S. of the former and 20 m. N. of the latter; area, 381 sq. m.; pop. (1905) 182,024; capital, Fort de France; S. of the middle it is nearly cut in two by the opposite bays of Fort de France and Francois; the surface is mountainous, the highest peak being the Mont Pelée, near the N. end (4,430 ft.); it is a volcano, and was in violent eruption, 1851 and 1902. The climate is generally healthful, though warm on the coast. Hurricanes are occasionally destructive, from June to October. Most of the interior is still covered with forest and uninhabited. Sugar, cotton, tobacco, cacao, and coffee are cultivated; sugar, rum, and cocoa are exported. Martinique is a colony of France, has a governor and a council elected by limited suffrage, and sends a Senator and two Deputies to the French National Assembly. The largest town, St. Pierre, near the N. end of the W. coast, was totally destroyed by the eruption of Mont Pelée, 1902. The island was settled by the French, who founded St. Pierre, 1635; became a crown colony, 1675; was held by the British, 1794-1802.

Martius (mār'tē-sē-ōs), Carl Friedrich Philipp von, 1794-1868; German naturalist; b. Erlangen, Bavaria; was one of the naturalists who accompanied the Archduchess Leopoldina when she went to Brazil, 1817, to become the wife of the crown prince; traveled through the interior from Rio de Janeiro to Pará and ascended the Amazon; was knighted on his return, 1820; Prof. of Botany at the Munich Univ. and conservator of the botanical gardens, 1826-54; published "The Natural History of Palms," "Travels in Brazil"; planned and edited the first volumes of the great "Flora Brasiliensis," and to this and other botanical works contributed monographs. He also wrote on the ethnography of Brazil.

Martyr (from Greek word meaning a witness), term applied to all who suffer for a noble cause, but in a more limited sense to those who suffer death in order to bear witness to their religious belief, all other sufferers being designated as "confessors." Out of what remained of the records kept by the early bish-

ops, supplemented by the local traditions, were afterwards compiled the martyrologies of the principal Greek and Latin churches. The "Roman Martyrology" aims at combining a complete list of martyrs and saints, with their "acts," and the days of the month on which their feasts occur. The Roman catacombs contain the remains of large numbers of martyrs. From this great storehouse the Roman Catholic churches are chiefly supplied, the altar stone on which the mass is offered always containing a relic of some martyr. By Protestants the term martyrs is also applied to those who have suffered death as "heretics" at the hands of Roman Catholics. Fox's "Book of Martyrs," which first appeared in London, 1563, details with much minuteness the persecutions of the early Protestants. See ACTA SANCTORUM.

Marvel, Ik. See MITCHELL, DONALD G.

Mar'vill, Andrew, 1621-78; English poet; b. Winestead, Yorkshire; became the friend and assistant of Milton in the Latin secretaryship; was for many years member for Hull in the House of Commons; was the constant friend of liberty both under the Commonwealth and after the Restoration; was called the "British Aristides." His best known poems are the "Song of the English Exiles in Bermuda" and the "Horatian Ode on Cromwell's Return from Ireland."

Marx, Karl, 1818-83; German socialist; b. Treves, of Jewish parents; became, 1842, editor of the *Rheinische Zeitung*, a radical journal published in Cologne, which was suppressed by the Prussian Govt., 1843; settled in Paris and continued his attacks on the Government in the *Vorwärts*; was expelled from France, 1845, and stayed for a time in Brussels, where he founded a German workmen's association, and with his friend Engels issued a "Manifesto" to the laboring classes of all nations, setting forth the creed of the communists. Expelled from Belgium, he returned to Cologne, and there published the *Neue Rheinische Zeitung*, but was again obliged to leave Germany, and after 1850 lived in London. In 1859 appeared a work containing the principles afterwards elaborated in his masterpiece, "Capital," 1867. He founded, 1864, the *International*, and continued its direction till 1872. He also aided in the formation in Germany of the Social Democratic Labor Party. The salient features of his social philosophy are the theory of surplus value and the belief in the inevitable downfall of capitalism, i.e., the possession of the instruments of labor by the capitalist class; capital, in his opinion, being simply "dead labor."

Ma'ry, THE BLESSED VIRGIN, mother of Jesus. Concerning the birth and parentage of Mary the Gospels tell us nothing; as to her share in the Incarnation, they are explicit, dwelling especially on the events that immediately preceded the birth of Jesus and on certain circumstances of his childhood. The years at Nazareth, after the finding of Jesus in the Temple, are summed up in the words, "He was subject to them," i.e., to Mary and Joseph. During the public life of Jesus his mother

appears but rarely. At the foot of the cross the "beloved disciple" takes her unto his own [home], and again on the day of Pentecost she is present in the "upper chamber." After that the sacred record in regard to her is silent. See MADONNA; MARIOLATRY.

Mary, QUEEN OF SCOTS. See MARY STUART.

Mary I, 1516-58; Queen of England; b. Greenwich Palace; daughter of Henry VIII and Catharine of Aragon; was betrothed to the Emperor Charles V, who, after the divorce of Henry from Catharine, broke the contract; alienated her father's affection by adhering to her mother's cause, and was suspected by him because she was looked upon as the head of the Roman Catholic party; on the execution of Queen Anne, 1536, was compelled to sign articles acknowledging that her mother's marriage was illegal and her own birth illegitimate, which involved a renunciation of her own right to the throne, but eventually had her right to the succession restored to her. She succeeded to the throne, 1553, after a short struggle with the party supporting Lady Jane Grey; restored Bonner, Gardiner, and other bishops who had been deposed to their sees, and quelled, 1554, an insurrection of the Protestants under Sir Thomas Wyatt. In July, 1554, she was married to Philip II of Spain, and then began a persecution of Protestants, during which Cranmer, Latimer, Ridley, and others—some 300 in all—were burned at the stake, that caused her to be called "Bloody Mary." Mary aided Philip in his war against the French, 1557, and their united forces gained a victory at St. Quentin; but Calais was captured by the Duke of Guise, 1558, and its loss probably hastened her death.

Mary II, 1662-94; Queen of Great Britain; b. St. James Palace; daughter of James II by Anne Hyde; was educated in the Protestant faith, and, November 4, 1677, married her cousin, the Prince of Orange (King William III), with whom she was declared joint sovereign, 1689.

Mary'land (named in honor of Henrietta Maria, wife of Charles I), popular name OLD-LINE STATE; state in the S. Atlantic division of the American Union; bounded N. by Pennsylvania, E. by Delaware and the Atlantic Ocean, S. and SW. by Virginia, W. by W. Virginia; area, 12,327 sq. m.; pop. (1910) 1,295,346; capital, Annapolis; principal cities and towns, Baltimore, Cumberland, Hagerstown, Frederick, Cambridge, Frostburg, Salisbury, Havre-de-Grace, Westminster, Crisfield, Easton, and Chestertown.

It is divided into what are known as the E. and W. Shores by Chesapeake Bay, which reaches to within a few miles of its N. boundary; surface of the E. shore level; of the W., rolling, and rising into a series of undulating hills, which in the extreme W. give place to the Catoctin, Blue Ridge, Appalachian, and Alleghany mountains. The only good harbors are on Chesapeake Bay, which is deeply indented with estuaries and coves. The rivers on the W. shore are the Potomac, Patuxent, Patapsco, Gunpowder, and Susquehanna; and on

the E., the Elk, Sassafras, Chester, Choptank, Nanticoke, Wicomico, and Pocomoke. These all empty into Chesapeake Bay. The climate is mild, the chief differences being due to elevation. No part of the state is without some snowfall in winter.

Minerals possessing industrial value include iron, copper, antimony, lead, zinc, gold, and chrome; coal; building and decorative stones; granite, sandstone, marble, and limestone; brick, potter's and porcelain clays; sand, soapstone, and hydraulic cement; total mineral output (1910) valued at \$15,440,207. The chief agricultural products are corn, wheat, oats, barley, rye, buckwheat, potatoes,



SEAL OF MARYLAND.

hay, tobacco, fruits, and vegetables; value of farm crops (1909), \$31,464,000; value of farm live stock (1910), \$32,570,000. Market gardening and truck farming are carried on extensively; dairy farming is fully as important; in W. Maryland are noted peach orchards. Principal manufactures, flour, machinery, fertilizers, iron and steel, lumber and timber products, furniture, boots and shoes, paper, cotton and woolen goods, and tobacco. According to the U. S. census of 1909, the state had 4,837 factory-system manufacturing plants, operated on a capital of \$251,227,000, and yielding products valued at \$315,669,000. The canning and packing of fruits, vegetables, and oysters is the largest industry. The oyster, shad, and other fisheries of Chesapeake Bay are a source of large revenue. The leading educational institutions outside of Baltimore are Rock Hill and St. Charles colleges, Ellicott City; West Maryland College, Westminster; the Woman's College, Frederick; St. John's College, Annapolis; State Agricultural College, College Park; State Normal School, Frostburg; and Jacob Tome Institute, Port Deposit. The U. S. Naval Academy is at Annapolis.

The first settlement in Maryland was made on Kent Island, Chesapeake Bay, 1631, by Puritans from Virginia. The main colonization was made, 1634, by English Roman Catholics under a charter granted to Cecilius Calvert, Baron of Baltimore, and St. Mary's was founded. This colony was autonomous, and was noted for its toleration in religious mat-

ters. For a time during the civil war in England the government was in the hands of Puritans, who had seized it. In 1690 Protestants again seized the government, and not till 1716 was the province restored to the Calvert family, lords proprietary. Maryland declared her independence of Great Britain, July 3, 1776, and took an active part in the Revolution, but did not enter the confederation till 1781. She was the first of the thirteen original states to ratify the Federal Constitution. During the War of 1812 the battles of Bladensburg and North Point were fought, and Baltimore was unsuccessfully attacked by the British. The only considerable battle on Maryland soil in the Civil War was that of Sharpsburg, September 16-17, 1862.

Mary Magdalene. See MAGDALENE.

Mary Stuart, 1542-87; Queen of Scots; b. Linlithgow, Scotland; daughter of James V by Mary of Guise, and great-granddaughter of King Henry VII of England through his daughter Margaret Tudor; was crowned queen, September 9, 1543, her father having died, the Earl of Arran, and afterwards her mother, conducting the government; was educated at the French court; married to Francis, Dauphin of France, son of Henry II, 1558; became Queen of France, 1559, but lost her husband, 1560, and had little power at court, where the influence of Catharine de' Medici was then paramount. Mary returned to Scotland, 1561; estranged the Protestants by her marriage, July, 1566, with her cousin, Henry Stuart, Lord Darnley, like herself a Roman Catholic, and next to herself in the hereditary line of succession to the English throne. Her half-brother, James, Earl of Murray, and other nobles opposed to this marriage, revolted, but were suppressed. Her husband, refused the crown matrimonial and incensed by favoritism shown to Rizzio, an Italian adventurer and Mary's chief councilor, took revenge by heading a party of nobles who stabbed Rizzio to death.

Mary detached Darnley from the other conspirators, became reconciled to Murray, entered into an intimate alliance with the Earl of Bothwell, and, thus strengthened, began to persecute the murderers of Rizzio. On February 9, 1567, the house in which Darnley lay sick was blown up with gunpowder, Bothwell, with the queen's consent, being the chief instrument in the murder. When, three months after, Mary married Bothwell, a general uprising took place. Bothwell was defeated and fled, and Mary was confined in Lochleven Castle and compelled to abdicate. Escaping, May, 1568, she rallied a new force, but was defeated and fled to England. Here, during eighteen years' imprisonment, she was the center of Roman Catholic plots, and finally was tried on a charge of complicity in the conspiracy of Antony Babington against the life of Queen Elizabeth. On February 8th she was executed, persisting to the last in her innocence. Her only child, b. 1566, became James VI of Scotland and James I of England.

Mar'zials, Théophile, or Theodor, 1850- ; English song writer; b. Brussels, Belgium; be-

came, 1870, superintendent of the music department of the British Museum; composer of many popular songs, including "Twickenham Ferry," "Ask Nothing More," "The Miller and the Maid"; author of "The Gallery of Pigeons and Other Poems."

Masaccio (mā-săt'chō), true name, TOMMASO GUIDI; nicknamed TOMMASACCIO, "Hulking Tom," shortened to MASACCIO, 1402-28 or 1429; Italian painter; b. Florence. At the age of nineteen he was enrolled in the Guild of the Apothecaries, but at twenty-two he was registered in the Guild of Painters. He is supposed to have worked under Masolino, who encouraged a frank study of the nude and a direct recognition of nature in the details of his figures. The greatest work of Masaccio now remaining is the decoration in fresco of the Brancacci chapel in the Carmine at Florence. Its importance in the history of art may be judged by the fact that at one and the same time Michelangelo, Raphael, and Leonardo da Vinci were engaged in studying these frescoes; and they have served as models to artists of succeeding generations. The only other probable work of Masaccio's, and the earliest, is in a chapel of San Clemente at Rome; it is a series of frescoes relating to the history of St. Catherine of Alexandria. Died in Rome.

Mascagni (mās-kān'yā), Pietro, 1863- ; Italian composer; b. Leghorn; became famous by his one-act opera, "Cavalleria Rusticana," composed in a prize competition, 1890; later works, "L'Amico Fritz," "I Rantzau," "Guglielmo Ratcliff," "Zanetto," "Iris," and a "Hymn" in honor of Admiral Dewey.

Mas'calonge, or **Mus'kellunge**, largest, finest, and best flavored fish of the pike family, *Esox* or *Lucius maskinongy*, especially abundant in the St. Lawrence basin, but frequently found in the basin of the Ohio and the upper Mississippi; reaches a length of 4 to 6 ft. and a weight of 60 lb. or more.

Mascara (mās-kā-rā'), town in province of Oran, Algeria; occupies the site of an old Roman colony on the slope of the Atlas Mountains, among fertile and well-cultivated surroundings. Pop. (1906) 22,934.

Mascarene' Isles, collective name comprising the islands of Bourbon, Rodrigues, and Mauritius, in the Indian Ocean; name derived from Garcia Mascarentas, a Portuguese navigator who discovered the islands, 1505. Mauritius and Rodrigues belong to Great Britain; Bourbon belongs to France.

Masho'naland, plateau region NE. of Matabeleland, S. Africa, to whose ruler it was subject when it was acquired from him (1890) by the British South Africa Company. A pioneer expedition was sent to take possession

of the land, which was believed to abound in gold reefs. Careful investigation proved that the region was rich in gold and other valuable minerals; that its agricultural resources were worth developing, and that the undulating plateau is so high above the sea that white colonists may live there in comfort. The most important settlements are Fort Salisbury, Hartley Hill, Victoria, Umtali, and Fort Charter. A telegraph connects the principal centers with Cape Town. Mashonaland with Matabeleland constitute the two provinces of S. Rhodesia; pop. of former (1907), native, 445,316; European, 6,364.

Masinis'sa, or **Massinissa**, abt. 240 B.C.-148; King of the Massylians, one of the most powerful Numidian tribes; son of Gala. Hasdrubal having promised to give him his daughter Sophonisba in marriage, he attacked the Massæsylians, also a powerful Numidian tribe, which in the struggle between Rome and Carthage sided with Rome; defeated their king, Syphax, 213; crossed over to Spain and fought with success against Cneius and Publius Scipio; but when Hasdrubal broke his promise and gave his daughter to Syphax in order to win him over from the Romans, Masinissa attacked Carthage. In the beginning he was unsuccessful, but when (204) Scipio landed in Africa, Masinissa entered into an alliance with him, routed the Massæsylians, fought with great distinction in the battle of Zama, and received by the Peace of 201 the territories of Syphax. Sophonisba, who in the course of the war had become his prisoner, he now married, but Scipio, fearing her influence on her husband, demanded her as a Roman captive, and Masinissa, not venturing to refuse, sent her a cup of poison, which she drank. Steadily extending his dominions at the expense of Carthage, he occasioned the third Punic War, but died before its close. Numidia was then divided between his three sons, of whom the youngest, Mastanabal, was the father of Jugurtha.

Mask, a system of decoration taking the form of a head, usually carved whimsically



ANCIENT GREEK MASKS.

and surrounded with a garland. It is sometimes placed in the center of a cartouch, serving as an ornament for a keystone, for the central portion of a lintel, of a panel, or the like. The term is also applied to theatrical

masks, of which the two common types are the tragic and the comic masks, both inspired by antique models. They are generally used in decorating the façades of theaters, or are placed on monuments erected to the memory of dramatic or lyric authors or actors.

Mask, Iron. See IRON MASK.

Maskat', or **Muscat',** fortified city, capital of Oman; in a fertile plain, on the border of an inlet of the ocean; has the best harbor for hundreds of miles; is a port of call for the Persian Gulf mail steamers. The trade in coffee, pearls, salt fish, dyestuffs, etc., is mostly with India. Pop., with neighboring town of Matra, abt. 25,000.

Maskelyne (mās'kē-līn), **Nevil**, 1732-1811; English astronomer; b. London; became astronomer royal at Greenwich, 1765; went to Scotland, 1772, to determine the mean density of the earth by observing the effect of the mountain Schehallien on the plumb line; originated the *Nautical Almanac*, and superintended it from 1767 till his death; was the first to publish "a standard catalogue of stars."

Ma'son, Francis, 1799-1874; American missionary; b. York, England; was originally a shoemaker; came to the U. S., studied theology, and, 1830, was sent by the American Baptist Missionary Union to Burma. He labored among the Karens, and translated the Bible into two dialects of their language; published "Burmah: Its People and Natural Productions," a grammar, chrestomathy, and vocabulary of the Pali language; translations from the Burman, Pali, and Sanskrit; a "Life of Ko-Thah-Byu," and an autobiography.

Mason, George, 1725-92; American patriot; b. Doeg's Neck, in present Fairfax Co., Va.; great-great-grandson of Col. George Mason, an officer in the army of Charles II, who after the defeat at Worcester, 1651, escaped to Virginia. He drafted the "Declaration of Rights" and "Plan of Government," 1776; was a member of the Continental Congress, 1777, and the Federal Constitutional Convention, 1787; refused to sign the Constitution on the ground that it contained dangerous features; united with Patrick Henry in demanding its rejection unless specific amendments should be made; elected U. S. Senator, but declined.

Mason, James Murray, 1798-1871; American legislator; b. Analoosta Island, Fairfax Co., Va.; grandson of the preceding; began practice of law, 1820; served in the state legislature; member of Congress, 1837-39; U. S. Senator, 1846-61; was the author of the Fugitive Slave law; entered, 1861, the Confederate Congress; was sent with John Slidell as a commissioner to England and France; was taken off the British steamer *Trent* by Capt. Charles Wilkes, November 8, 1861, and confined in Fort Warren, Mass.; released on the demand of the British Govt., January 2, 1862; and represented the Confederacy in Paris during the remainder of the war.

Mason, John, 1586-1635; founder of the colony of New Hampshire; b. Lynn Regis, Eng-

land; became Governor of Newfoundland, 1616; explored the New England coast, 1617; obtained a grant of land, now in NE. Massachusetts, 1622; with Sir Ferdinando Gorges procured a patent for the province of Maine the same year; received a patent for the New Hampshire colony, 1629; became a judge in New Hampshire and vice admiral of New England; buried in Westminster Abbey.

Mason, Lowell, 1792-1872; American composer; b. Medfield, Mass.; removed to Savannah, Ga., where he taught music, 1812; published his "Boston Handel and Haydn Collection of Church Music," 1821; began in Boston the instruction of classes in vocal music, 1827, and afterwards established juvenile classes, teaching them gratuitously; published fifteen or sixteen juvenile collections of music, seven or eight glee books, mostly with George J. Webb, and more than twenty sacred and church music books. In all these books are many of his own compositions.

Mason and Dixon's Line, line drawn (1763) by Charles Mason (1730-87), an English astronomer, and Jeremiah Dixon, at the instance of the proprietors of Pennsylvania and Maryland, as a boundary between their possessions. It lies at the parallel of lat. 39° 43' N., and extends to 244 m. W. of the Delaware River. The task was completed December 26, 1767. As the practical N. limit of the original slave states, Mason and Dixon's line was prominently mentioned in the controversies concerning slavery. The last 35 m. were drawn by other persons, 1782-84.

Mason Bee, name applied to numerous bees, chiefly of the genus *Osmia*, which construct their cells of mud. They put their cells in the hollow stalks of plants, in empty shells, under flat stones, inside oak galls, in chambers which they construct in rotten wood, etc. Some species form cells of great beauty and perfection, and line them with a kind of silk. The ceilings of many Egyptian temples are completely covered with these cells, masses of which hang down like stalactites.

Ma'sonry, fraternal institution, existing in some form and to some extent in nearly every civilized country. Those seeking admission into it must be free men, and must be accepted with substantial unanimity; hence its members term themselves "Free and Accepted Masons"; from this circumstance the institution is frequently called "Freemasonry." Its legends say that it was organized at the building of the temple by Solomon. Some writers trace it to the ancient mysteries (especially the Eleusinian), others to the Essenes, others to the Roman colleges, and still others to the Culdees. Within comparatively recent years supposed traces of Masonry have been found in the Holy Land, on the Egyptian obelisks, and in the pyramids.

But the theory that Masonry is an outgrowth of mediæval operative masonry has much greater support both from internal and external evidence. The tradition of the society, from the earliest times, is that originally it was an operative institution. There is abun-

dant ground for the tradition that the originally flourishing brotherhood of operative masons at last fell into decay, and for the theory that some of its members, perceiving that as an operative institution it had no longer a reason for existence, determined to continue it as a "speculative" society to promote the practice of the moral, fraternal, and charitable principles which had characterized the old organization.

The present form of organization was adopted 1717; in the earlier times it was scarcely allowable to commit to writing anything relating to Masonry; but in spite of this, copies of old *charges* are extant, made in the fourteenth, fifteenth, sixteenth, and seventeenth centuries. Some of them are not dated, and opinions differ as to the time when they were written, but as one of them is dated December 25, 1583, it shows the existence of an organization at that date which was not a new one. Some of these are entitled "The Constitution of Masonry" and some "The Constitutions of the Freemasons."

The foremost fundamental principle of Masonry is belief in God and the acceptance of a Book of the Law as a revelation of His will. To the Christian the Book of the Law is the Bible, and to the Hebrew the Old Testament; and no lodge can be lawfully opened unless the Book of the Law lies open on the altar. Beyond this no religious test is allowed. The primary organization is the lodge, with master, wardens, and other officers. The lodge has jurisdiction over three degrees, called Entered Apprentice, Fellow Craft, and Master Mason.

The work of Masonry, especially in the U. S., is conducted according to several rites, of which the York, the Scottish, and the Cryptic are the most prominent. Beyond the "blue lodge" with its three degrees, are the Chapter with four degrees, those of Mark Master, Past Master, Most Excellent Master, and Royal Arch; and the Council with three degrees, Royal Master, Select Master, and Super-Excellent Master. The Scottish Rite has twenty-nine degrees, from the fourth to the thirty-second inclusive, and also an official degree—the thirty-third. Connected with Masonry to the extent that membership is limited to Masons of specified degrees are a number of other bodies, of which the Order of Knights Templars and the Ancient Arabic Order of the Nobles of the Mystic Shrine (the latest) are the most prominent.

Masonry, constructions in stone or brick with mortar, classified into stone masonry, brick masonry, and concrete or *béton*. *Stone masonry* is divided into *cut stone* (or *ashlar*) masonry and *rubble masonry*. *Concrete* may be *brick*, *stone*, *gravel*, or *shell* concrete, depending on the material used for ballast. The front of a wall is termed its *face*, and the material composing it *facing*, as distinguished from the *back* and *backing*, which apply to the rear or inner surface of the wall. The interior is called the *heart*, and the material *hearting* or *filling*. When the face or back of a wall is not vertical, but inclines toward the wall from bottom to top, the inclination is called the *batter* or *bâtir*. Thus "a face batter of 1 in

20" means that in a height of 20 ft. the face of the wall departs a foot from a vertical line. The method of arrangement of the stones or bricks in order to secure strength and unity of mass is called the *bond*. *Headers* are those stones or bricks which show an end upon the face and back of the wall, and therefore reach into the wall their entire length and bind it together transversely. *Stretchers* are laid to show their longest dimensions on the face or back, as the case may be, and to give longitudinal strength.

When a header extends through from face to back, it is termed a *through*. In thick walls the headers should reach back at least 18 in. beyond the contiguous stretcher; they are then termed *binders*. The lower surface of a stone is termed its *lower bed*, the upper surface its *upper bed*. All the spaces between contiguous stones are also called joints, whether above, below, or at the sides. *Ashlar* is an external facing of cut stone laid with close joints in courses, the quality of the face dressing being such—either axed, tooled, rubbed, or polished—as will best suit the character of the material and the design of the work under construction. The stones of each course should be dovetailed and notched or clamped into one another, so that no single piece can move without displacing a large mass, and each course should be firmly connected with those above and below it. To prevent sliding, projections may be left in the beds of one course to fit into corresponding cavities of the contiguous course. Heavy wrought-iron bolts may be inserted vertically through several courses to prevent the uplifting of the mass.

Concrete (béton) masonry is admirably adapted to many important purposes. A brief description of the method of preparing and laying it is given under Concrete Construction. For foundations in damp and yielding soils and all kinds of submarine constructions; for quay walls, jetties, piers; for foundations, hearting and backing of massive walls generally; for cisterns, reservoirs, and tanks; for tunnels and aqueducts, and for many other purposes, it possesses advantages over either brick or stone masonry. *Brick masonry*, when both the brick and mortar are of good quality and the work is well done, is strong and durable. Various kinds of bond are used, the most usual being the *English* and *Flemish*. The first consists in arranging the courses alternately entirely as *headers* or *stretchers*, the bricks through the course breaking joints. In the second the bricks are laid as headers and stretchers in each course. The first gives the strongest bond, and the second the best architectural effect. Hollow brick walls are much used, the thickness of the inner shell being usually 4 in., or the width of one brick. It is tied to the outer wall at frequent intervals with iron clamps, or more generally with bricks laid transversely or diagonally, and bonded into the masonry at both ends. Moisture will not condense on the inner surface of such a wall. See FOUNDATIONS.

Maspero (mäs-pä-rö'), Gaston Camille Charles, 1846-1916; French Egyptologist; b. Paris, of Italian parents; became Prof. of Egyptology in

the School of Higher Studies, Paris, 1869, and of Egyptian Philology and Archaeology in the College of France, 1873; succeeded Mariette Bey as director of the museum at Bulak (now in Gizeh), 1881-86; made professor in the Institute of Paris, 1886; director of Egyptian excavations after 1899. He excavated the pyramids of the kings of the fifth and sixth dynasties and the burial fields of Sakkara and Dahshur, and discovered burial sites near the entrance to the Valley of the Tombs of the Kings, at Eckmin, and other places. His publications include "Ancient History of the Nations of the Orient," "Egyptian Archaeology," "Life in Ancient Egypt and Assyria," "Dawn of Civilization," "Popular Tales of Ancient Egypt," "The Struggle of the Nations," "The Passing of the Empires," etc.

Masque (mäsk), species of dramatic entertainment, comprehending scenic effects and dancing. It was much cultivated in Europe during the sixteenth and seventeenth centuries, and reached its highest perfection in England in the reign of James I, when Ben Jonson and the leading dramatic authors, with the exception of Shakespeare, wrote masques for the court. Milton's "Comus" and "Arcades" are exquisite specimens.

Masquerade (mä-s-kér-äd'), amusement generally consisting of a ball, public or private, in which the participators wear masks for purposes of disguise. An eccentric costume was an early feature of the masquerade, and under the form of a "fancy ball" has nearly superseded it in Great Britain and the U. S., each guest personating some mythological or historical character or assuming the costume of some remote people. The masquerade proper flourished in Italy in the fifteenth century, and was introduced at the French court by Catharine de' Medici, and at the English in the time of Henry VIII. To the present day a masked ball is in Roman Catholic countries an invariable feature of the carnival season.

Mass, in the Roman Catholic Church, the eucharistic oblation; offered in obedience to Christ's command, "Do this for a commemoration of me." It is a sacrifice in which the separate consecration of the bread and of the wine "shews the death of the Lord" (I Cor. xi, 26), and in which his body and blood are received in communion. These essentials of the mass are preceded and followed by extracts from the psalms, epistles, and gospels, and by prayers, some of which are always recited, while others vary according to the season or according to the purpose for which the mass is offered. These, as well as the ceremonies of the mass, differ considerably in the various rites. In the Western Church the Latin rite prevails; in the Eastern, the Greek, Syriac, Coptic, etc., are still distinct. A *low mass* is one which is celebrated without chant, incense, or the assistance of deacon and subdeacon. With these additions it is called a *high mass*. A *requiem mass* is offered for the dead, and *pontifical mass* is celebrated by a bishop.

Massachu'setts (named after the Massachusset Indians); popular name, the "Bay State";

state in the N. Atlantic division of the American Union; bounded N. by Vermont and New Hampshire, E. by the Atlantic Ocean, S. by the Atlantic Ocean, Rhode Island, and Connecticut; W. by New York State; greatest length, 184 m.; area, 8,266 sq. m.; pop. (1910) 3,366,416; capital, Boston; principal cities and towns, Boston, Worcester, Fall River, Lowell, Cambridge, Lynn, Lawrence, New Bedford, Springfield, Somerville, Holyoke, Brockton, Haverhill, Salem, Chelsea, Malden, Newton, Fitchburg, Taunton, Gloucester, Everett, North Adams, Quincy, Waltham, and Pittsfield.

The extreme W. part of the state is crossed by two mountain chains—the Taconic or Taghkanic, containing the highest eminence in Massachusetts, Greylock or Saddleback, 3,505 ft., and the Hoosac, a continuation of the Green



SEAL OF MASSACHUSETTS.

Mountains of Vermont, which in no place exceeds 2,510 ft. These inclose the Housatonic Valley. A rugged tableland, cleft by deep river valleys, extends from the Hoosac Mountains to the Connecticut River Valley. Here is a series of trap ridges, which rise in Mt. Tom and Mt. Holyoke to 1,200 and 1,120 ft., respectively. The valleys of the Connecticut, the Deerfield, and the Housatonic are noted for their beautiful scenery. The surface between the Connecticut and Blackstone rivers is mainly a broken tableland, about 1,000 ft. high, containing isolated summits, the most conspicuous being Wachusett, 2,018 ft. high. The state E. of Worcester Co. is undulating or hilly, descending gradually toward the ocean. The highest point of land near the ocean, 620 ft., belongs to the Blue Hills of Milton. Cape Cod largely consists of glacial sands and gravels, interspersed with numerous ponds. The E. coast of the state is bordered in places by extensive salt marshes. The principal islands are Martha's Vineyard (about 100 sq. m.), the sixteen Elizabeth Islands, constituting the county of Dukes; Nantucket (about 17 m. long), with a few small islands, constitutes Nantucket Co.; Monomoy, off the SE. extremity of Cape Cod, and Plum Island, off the NE. coast of Essex Co. The largest bay is Massachusetts, which contains Boston Bay, Lynn, Marblehead, Salem, and Gloucester harbors; Cape Cod, next in size, contains Duxbury Bay, Plymouth harbor, Barn-

stable harbor, Wellfleet Bay, and Provincetown harbor, at Provincetown. Buzzard's Bay, 30 m. in length and averaging 8 m. in width, contains New Bedford, Fairhaven, Wareham, and other harbors.

The principal river, the Connecticut, has a course of more than 50 m. in Massachusetts. Its principal tributaries are the Miller's, Chicopee, Agawam or Westfield, and Deerfield rivers. The Housatonic rises in Berkshire Co. and flows through Connecticut into Long Island Sound. The NW. part of the state is drained by the Hoosac, which joins the Hudson in New York State. The largest stream E. of the Connecticut, the Merrimac, has its sources in New Hampshire, but for 35 m. it flows through Massachusetts and empties into the Atlantic at Newburyport. It is navigable for vessels of 200 tons as far as Haverhill, 15 m. from its mouth. The Nashua unites with the Merrimac in New Hampshire, but has its sources in Worcester Co., Mass. The Concord is formed by the junction of the Sudbury and Assabet rivers, and joins the Merrimac at Lowell. The Charles River, about 75 m. in length, empties into the estuary between Boston and Cambridge. It is navigable to Watertown, 7 m. from Boston. The Blackstone River, 75 m. in length, rises in Worcester Co., crosses the NE. corner of Rhode Island, and below Providence expands into an estuary, called Pawtucket or Seekonk River, an extension of Providence Bay. Taunton River rises in Plymouth Co. and empties in Mt. Hope Bay at Fall River. It is navigable as far as Taunton. Lake Quinsigamond, near Worcester; Watuppa Pond, near Fall River, and Long, Assowompsett, and Great Quittacus ponds, in Plymouth, are among the few landlocked bodies of water of large size. The climate in general is cool, with prevailing E. and NE. winds from February to May and W. and SW. winds during the summer and fall; winter season, from December to March, usually cold and rigorous; average rainfall, about 48 in.; average July temperature in Boston, 71.7°; in Springfield, 73.2°.

Much of the soil is stony or sterile; the lands of the Connecticut Valley and its uplands, though sandy, are very productive, and throughout the state skill and patience in cultivation have secured considerable productiveness. Dairying is an important industry, especially in the W. counties; cranberry growing is a lucrative industry in Plymouth and Barnstable coe. Production of principal crops (1911): Corn, 2,068,000 bushels; oats, 280,000; rye, 48,000; buckwheat, 42,000; potatoes, 2,325,000; hay, 631,000 tons; tobacco, 9,240,000 lb.; total value, \$20,554,000. Chief minerals: Granite, sandstone, anthracite, coal, marble, limestone, graphite, corundum, feldspar, mica, iron ore, limonite, potter's clay, galena, and ocher, while gold and silver are found in small quantities; total value mineral products (1911), \$6,077,370. The magnificent water power of Massachusetts has made it one of the leading manufacturing states. Chief industries, textiles, boots and shoes, machines and machinery, metals and metallic goods, paper and paper goods, and leather. Capital invested in manufactures (1909), \$1,279,687,000; value products, \$1,490,529,000.

The harvesting and storage of ice for commercial purposes, shipbuilding, and fish canning and preserving are carried on extensively in the E. part of the state. The fisheries, both of the coast and of the deep sea, employ large numbers of vessels. The principal fishing ports are Gloucester, Yarmouth, and Provincetown. Value of salt-water products (1908) \$7,095,229.

Massachusetts has eleven ports of entry: Barnstable, Boston, Edgartown, Fall River, Gloucester, Marblehead, Nantucket, New Bedford, Newburyport, Plymouth, and Salem. Value of imports of domestic and foreign merchandise in fiscal year 1911, \$117,394,813; exports, \$71,585,473. A ship canal connecting Buzzard's Bay with Cape Cod Bay was begun 1907.

Principal religious bodies: Roman Catholic, Congregational, Baptist, Methodist Episcopal, Unitarian, Protestant Episcopal. Massachusetts is noted for the excellence of its public schools and higher institutions of learning. Free normal schools are maintained by the state in Bridgewater, Fitchburg, Framingham, Hyannis, Lowell, N. Adams, Salem, Westfield, and Worcester for the training of teachers, and there is a state normal art school in Boston. For industrial training there are finely appointed schools in Boston, Cambridge, and Brookline. The Horace Mann School for the Deaf, in Boston, and the Clarke Institution, at Northampton, for the same class; the Sarah Fuller Home for little deaf children, in Medford; the Boston School for the Deaf, in Jamaica Plain; the New England Industrial School for Deaf-mutes, in Beverly; the Perkins Institution and Massachusetts School for the Blind, in South Boston, and Massachusetts School for the Feeble-minded, at Waltham, are noble and widely known institutions. The universities and colleges of liberal arts are Amherst College, Boston College, Boston Univ., Harvard Univ., French Protestant College, in Springfield; Tufts College, Williams College, Clark Univ., and the College of the Holy Cross, in Worcester. The colleges for women comprise Smith College, Mt. Holyoke College, Wellesley College, Radcliffe College, Cambridge, and Simmons College, Boston. Other notable institutions for female education are Abbott Academy, Andover and Bradford Academy, Lassell Seminary, in Auburndale; and Wheaton Female Seminary, in Norton. There are two schools of science endowed with the National land grant—the Massachusetts Agricultural College, in Amherst, and the Massachusetts Institute of Technology, in Boston. The principal schools of law, medicine, theology, pharmacy, veterinary surgery, dentistry, etc., are departments of the large colleges and universities. Nearly every town in the state has a free library.

The aboriginal inhabitants of Massachusetts at the time of its settlement by whites belonged to the Algonquin stock, and lived chiefly E. of the Connecticut. In 1602 Bartholomew Gosnold, an Englishman, visited the coast, named Cape Cod, and, with his party, settled on Cuttyhunk Island, but soon abandoned it. Two settlements elsewhere, 1603, 1605, failed. In 1620 the colony of Plymouth was founded by English Separatists from Leyden, Holland, un-

der John Robinson. A rival colony, planted at Wessagussett (now Weymouth), 1622, by Thomas Weston, a London merchant, failed, as did another under Robert Gorges, 1623-24. Plymouth Colony, being unable to obtain a charter, progressed successfully under a governor and five assistants, chosen yearly by all the inhabitants. A settlement was made at Salem, 1626, and here, 1628, arrived a party of Puritans under John Endicott, one of the proprietors of a land company which had obtained a grant on Massachusetts Bay. In 1629 a charter was granted to the patentees and their associates in England, establishing a corporation and making the associates a body politic with power to establish a subordinate government in the New World. In 1629 another body of settlers arrived, and in the same year it was decided to transfer the charter and government to Massachusetts. John Winthrop was appointed governor, and, 1630, arrived with about 1,000 persons. Immigration continued; Boston, Dorchester, Lynn, and other towns were settled, and the wealth and social standing of the colonists, a few of whom belonged to the nobility, gave the Bay colony prominence. These Puritans soon adopted the "congregational way" of church government as practiced by the Plymouth Pilgrims. In 1651 Congregationalism was established by law.

In 1636 and 1637 troubles with the Pequot Indians led to the Pequot War, the principal losses of which, however, fell on the Connecticut Colony, an offshoot from that of Massachusetts Bay. During 1643-63 a confederacy for mutual protection existed, formed of the colonies of Massachusetts Bay (then including settlements in Maine and New Hampshire), Plymouth, Connecticut, and New Haven. Charles II, after his restoration, appointed a commission to investigate and govern these colonies, whose independent spirit was increasing, but the colonial authorities refused to permit them to exercise their powers. In 1675 the Massachusetts General Court declared that no other power but itself had the right to impose taxes. King Philip's War, 1675-76, checked the prosperity of Massachusetts for a long time. In 1684 the English High Court of Chancery declared the charter of Massachusetts forfeited; the General Court or Legislature was abolished, and royal governors were imposed. In 1692, by a new charter granted by the king, Massachusetts Bay and Plymouth were consolidated into one government.

Disturbances with the Indians were frequent, the French colonists in Canada prompting the savages to make raids on the colony of Massachusetts. From 1722 to 1725 these raids assumed the proportions of a war. In the war between England and France and in the war with France Massachusetts played a conspicuous part. Oppressive taxation, the hampering of commerce by restrictions, and the attempt to enforce the Stamp Act excited the people to rebellious acts, and, 1774, the port of Boston was closed. The first blood of the Revolution was shed at Lexington and Concord, 1775, and the battle of Bunker Hill occurred the same year. In 1780 Massachusetts adopted a state constitution. In 1788 occurred Shays's Rebellion.

The Constitution of the U. S. was ratified January, 1788; all religious denominations were placed on an equal footing, 1833; Maine was set off as a separate state, 1820. During the Civil War, 1861-65, the state furnished 159,165 men for all terms of service.

Massachusetts Institute of Technology, technical school founded at Boston, 1862, by Prof. William Barton Rogers and others. The original plan included not only the "school of industrial science," by which the institute is now best known, but also a society of arts and a museum of arts. Thirteen distinct four-year courses are offered, viz.: civil, mechanical, mining, chemical, electrical, and sanitary engineering, architecture, biology, chemistry, physics, general studies, geology, and naval architecture. For the completion of any one of these the degree of B.Sc. is given. A conspicuous feature is the laboratory instruction of large classes. It had (1910) 223 professors and instructors and 1,481 students in all departments. Its grounds and buildings are valued at about \$1,337,000, scientific apparatus \$393,000, and productive funds \$1,871,004.

Massage (mă-săzh'), mechanical method of medical treatment of the body, consisting chiefly in manipulation administered by the hand of a person trained to do this in a particular way. This form of treatment is sometimes confounded with what is known as the Swedish movement-cure, but is not the same—the latter involves active coöperation on the part of the patient. Massage has been applied to the treatment of a large number of disorders, both medical and surgical, and the range of its applicability is from mild hysteria to serious disorders of internal organs and fractures of the bones. It does good by mechanically pressing out from the tissues material which needs to be removed or to have its natural flow accelerated; the first, in the case of inflammatory effusions; the second, in the case of imperfect circulation. Besides this, massage acts by provoking muscle cells, and probably all cells, to greater physiological activity.

Massagetæ (mă-săj'ë-të), tribe of doubtful origin inhabiting the steppes to the N. of the Jaxartes. According to Herodotus, it was with them that Cyrus of Persia went to war, and fell in battle, 529 B.C., their queen, Tomyris, having refused an offer of marriage made by Cyrus for the purpose of picking a quarrel with her. According to Ctesias, the war was with another tribe, and Cyrus died of his wounds after the battle.

Mas'sasoit, d. 1661; chieftain of the Pokanoket or Wampanoag Indians; found by the colonists of Plymouth, Mass., living in their vicinity, 1621, as ruler of the territory from Cape Cod to Narragansett Bay. He made a treaty with the settlers at Plymouth, March 22, 1621, and maintained friendship with them until his death. His permanent residence was in the present township of Warren, R. I., where he was frequently visited by commissioners from the neighboring settlements. He entertained Roger Williams for several weeks when banished from Massachusetts. He was supposed

to be eighty years of age when he died. He left two sons, Wamsutta and Pometacom, called by the colonists Alexander and Philip. They succeeded him in the chieftainship, the latter being the celebrated "King Philip."

Masséna (mā-sā-nā'), **André** (DUC DE RIVOLI, PRINCE D'ESSLING), 1758-1817; marshal of France; b. Nice; began his career as a cabin boy; became brigadier general, 1793; most brilliant exploits were his victory over the allied Austrian-Russian army at Zürich, September 25, 1799, which freed France from invasion; the siege of Genoa, 1800, which he held for three months, though invested by an Austrian army and blockaded by an English fleet; and his valorous defense of the villages of Aspern and Essling during the battle, May 21, 1809, which saved the French army from total destruction.

Massenet (mā-sé-nā'), **Jules Émile Frédéric**, 1842-1912; French opera composer; b. Moutaud; entered the Paris Conservatory when nine years old; took his first prize, 1859; won the Prix de Rome with his cantata "David Rizzio," 1863; most famous works: operas "Don César de Bazan," "Le Roi de Lahore," "Hérodiade," and "Le Cid"; oratorios or cantatas "Eve," "Marie Madeleine," "La Vierge," and his orchestral suites "Scènes Pittoresques."

Mass'ey, Gerald, 1828-1907; "poet of the English poor"; b. Tring, Herts, England. While a common laborer in London, he started with other workmen, 1849, *The Spirit of Freedom*, a radical weekly journal. He afterwards aided Maurice and Kingsley in establishing workmen's associations, and lectured on spiritualism and literary topics in Great Britain, and, 1873, in the U. S. He published "Poems and Chansons," "The Ballad of Babe Christabel and Other Poems," "Craig-crook Castle," "Voices of Freedom and Lyrics of Love," "Robert Burns and Other Lyrics," "Havelock's March and Other Poems," "Shakespeare's Sonnets Never Before Interpreted," "Concerning Spiritualism," "My Lyrical Life," etc.

Mass'singer, Philip, 1584-1640; English dramatist; b. Salisbury; best remembered by his tragi-comedy, "A New Way to Pay Old Debts," still popular chiefly because of the character of Sir Giles Overreach.

Mass'son, David, 1822-1907; Scottish author; b. Aberdeen; settled in London, 1847; contributed to the "Encyclopædia Britannica," the "English Encyclopædia," and the reviews; Prof. of English Literature in University College, London, 1852-65; of Rhetoric and English Literature in Edinburgh Univ., 1865-95; editor *Macmillan's Magazine*, 1859-68, of the *Register* of the Privy Council of Scotland after 1879; became Historiographer Royal for Scotland, 1893; most noted publication, "Life of John Milton," 6 vols., 1858-79.

Masso'rah, Masorah, or Masso'reth, technical name given to a collection of grammatical notes on the Hebrew text of the Old Testament, with the object of determining its divisions, grammatical forms, letters, vowel

marks, and accents. Tradition carries the origin of the *Masorah* back to the times of Ezra and the Söferim. The use of the Bible, especially of the Pentateuch, in the synagogue service, tended to draw the attention of teachers to its wording; and R. Akiba's method (which prevailed) of attaching importance to every single word and letter of Scripture enhanced the care with which the text was treated. It was necessary also to teach the text in the schools, and for this purpose divisions were made into paragraphs, sentences, and clauses. Two names, Nakkai and Hammuna, are mentioned who went as far as to count the number of verses contained in the twenty-four books of the Bible. This was about the time of the persecutions of Hadrian. Later Masorites went further, counted the number of verses in each book, the number of times certain forms occurred, and determined the way in which words were to be pronounced which, for one reason or another, were not to be read in the synagogue as written.

Massowa (mās'sō-wā), town on an island of the Red Sea within hailing distance of the African mainland; was obtained by the Turks in the seventeenth century, and Abyssinia's attempts to acquire it as a port always ended in failure. In 1885 Italy, taking advantage of Egypt's difficulties with the Mahdists, and with the connivance of England, seized Massowa, which is now her chief settlement and port in her African possession of Eritrea. Pop. (1906) 2,275.

Massys (mās-sis'), **Metsys**, or **Matsys**, **Quintyn**, 1450-1529; Flemish painter; b. Antwerp; began by working in iron. The gates of a well near the cathedral at Antwerp first attracted attention to his talent. He afterwards taught himself the art of painting in order to marry a woman who was unwilling to wed anyone but a painter. A triptych painted for the woodcarvers' guild in Antwerp, the center representing Christ surrounded by holy women, is one of his principal works. His portraits were highly prized; those of Erasmus and of Egidius are especially good. His son John, also a painter, was his pupil.

Mast, nearly upright spar of wood, iron, or steel rising upward through the decks of a vessel for the purpose of affording attachment to the sails and rigging of a ship. The fir and pine of Puget Sound and Norway are of great repute as material for masts. Iron and steel masts are constructed on several different systems. In all vessels of any considerable size each mast consists of several parts, of which the lowest is the mast proper, next the topmast, the topgallant mast, and the royal mast, and sometimes a skyscraper, the highest of all. The foremost mast of a ship is the foremast; the central one, the mainmast; the one farthest aft, the mizzenmast; and the separate parts of each are distinguished as the fore-topmast, the main-topgallant mast, etc., by combining the name of each mast with the appropriate name of each part of a mast. Ships, barks, barkentines and some schooners have three masts. Brigs, brig-

antines, and schooners ordinarily have two masts. Many sloops, smacks, luggers, and other small craft have but one mast. Large seagoing steamers have often four, and sometimes five, masts.

Mas'taba, name applied by the Egyptian Arabs to the tombs of the nobles of the fourth, fifth, and sixth dynasties, found at Sakkarah, near Memphis. The name is derived from the ordinary bench found in front of Egyptian houses. Though presenting the appearance of truncated pyramids they were different in their origin, being probably an outgrowth of the cairns erected to mark the burial places of prominent persons. In the earliest specimens, however, the sides were already formed of sloping masonry walls, and the tops were paved. In later times their place was taken by rock-hewn tombs. The largest specimens date from the fourth dynasty; the best executed from the fifth; those of the sixth show signs of decadence. Like all Egyptian tombs, they were intended to insure the preservation of the mummy, upon which the hope of "living again" depended. The ordinary mastaba contained three features: the mummy chamber and pit, the *serdab* (hollow space, or cellar), and the chamber of offering.

Mas'ter, name applied to various persons in positions of authority, and specifically used to designate an officer of the navy, the chief officer of a merchant vessel, and certain chief officers or functionaries of law courts, and of some other officials.

Master and Serv'ant, in law, persons who sustain such a relation to each other that one has the legal rights to direct and control all acts done on his behalf by the other. The word servant is a generic term embracing slaves; but where slavery does not exist, a servant is one who by contract has bound himself to render service to another, who in respect to the subject-matter of the contract is his master. The contract of hiring may be verbal or in writing; if it be for more than a year, it must be in writing, or it will be valid only so far as the parties have acted under it. When the time of service is fixed, neither party has a right to terminate the contract except for cause. The servant must obey all proper directions in respect to the service, attend faithfully to his duties, and be guilty of no grossly immoral or indecent behavior.

In the U. S. employers' liability for injuries sustained by workmen has been limited, first, by the legal rule of implied risk which holds that the workmen voluntarily assumes the risk connected with the occupation he engages in, and, second, by the rule of common employment which regards the agent or cause of an injury as a coservant, and the principal therefore not responsible. In Europe the individual workman is not held responsible for injury apart from willful or contributory negligence; the risk belongs to the occupation. In general, however, the master is bound to use all care to secure reasonable protection for those engaged in his business, to provide a safe place in which the servant can work, to see that

tools and machinery are free from discoverable defects and are kept in proper repair, etc.

Where a wrongful act is done by a servant by direction of the master, or in his presence so that his consent may fairly be implied, or as the natural or probable result of directions given by the master, or in the exercise of a discretion which the master has given, the master is answerable in damages to the person injured. If the servant steps aside from his duty to commit an intentional wrong, he alone is liable therefor; but if a railway conductor should in defiance of orders and willfully and wantonly inflict an injury on a passenger, the company would be liable, because it was its duty to see that the contract of carriage was not intrusted for execution to those who would negligently or purposely violate it. These rules of liability on the part of the master do not apply in favor of a servant who is injured by the carelessness or negligence of a coservant, unless he can show that the servant causing the injury was an incompetent or unfit person to be engaged in such employment, and that the master knew it when he employed him. One who entices a servant away before his time of service has expired, or who injures him so that he cannot labor, is liable to the master in damages.

Mas'tersingers (German, *MEISTERSÄNGER*), poets and rhymers who, after the decline of the minnesong in the thirteenth century, were the chief representatives of the poetic art in Germany for more than two centuries. In the reign of Charles IV they were formed into regular corporations, for admission to which a course of apprenticeship was required. Their chief seats were the imperial cities, and they flourished most at Nuremberg. These corporations began to decline in the seventeenth century. Among the most famous mastersingers were Hans Sachs, Muscatblüt, and Michael Behaim.

Mas'tic, gum resin used as an ingredient of many varnishes. By itself it is transparent,



MASTIC PLANT.

tough, brilliant, and delicate, and is often employed in finishing maps and paintings. It is

obtained from cuts in the bark of *Pistacia lentiscus*, *P. atlantica*, etc., shrubs of the order *Anacardiaceæ*. It comes from Barbary, the Levant, and especially from China. It has a limited use in medicine and in dentistry and in mounting objects for the microscope.

Mastication, act or process of chewing, as of food. It is a complex coördinated muscular act which depends on the activity of nerve centers in the brain, whose performances are guided by sensations generated in the sensory nerves distributed to the membrane lining the mouth, to the teeth, and to the muscles of the jaws and cheeks. The food is moved in various directions and mixed with saliva by means of the tongue chiefly, and is kept between the teeth by the opposing actions of the tongue on the one side and the lips and cheeks on the other. Most people habitually chew upon one side more than upon the other, although in a vast majority of cases food is by no means sufficiently masticated. A recent health fad, known as Fletcherism, has for its main tenet the thorough mastication of all food, on the rational grounds that less food is thus required, and that all food is better assimilated. In carnivora mastication is of little value owing to the small amount of nondigestible matter taken in. But in such animals as the grain-eating herds, which swallow seeds, etc., whole pebbles and coarse gravel are taken with the food; with the aid of these, the powerful muscles of the gizzard grind the food.

Mastiff, name applied to several distinct breeds of large watchdogs. The old English and Irish mastiffs resemble the bulldog in courage and strength, but excel him in magnanimity, faithfulness, and affection for man.

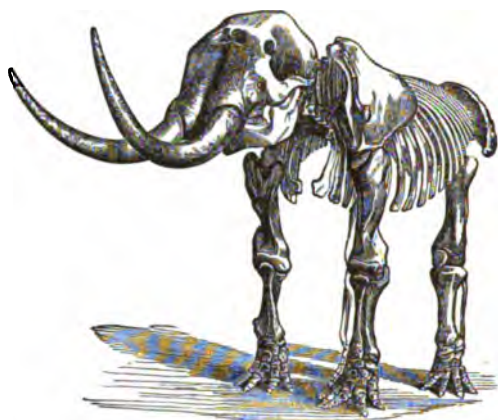


MASTIFF.

The Tibet mastiff, from central Asia, is one of the largest of the dog tribe. He is bred both as a sheep dog and as a defender of the house. The so-called Cuban bloodhound is really a mastiff of Spanish origin, but in ferocity and bloodthirstiness appears to excel all other breeds.

Mastodon, extinct mammal, resembling the elephant, found either in the Tertiary or more

recent deposits in all quarters of the globe except Africa. When alive the mammoth must have been 12 or 13 ft. high, and, including the tusks, about 25 ft. long. The best-known species is the N. American mastodon (*M. giganteus*, or *M. Ohioticus*). A few remains of the mastodon had been discovered in N. America as early as 1705. but not until 1801 was any-



SKELETON OF AMERICAN MASTODON.

thing like a complete skeleton obtained, when a tolerably complete one was procured from the morasses of Orange Co., N. Y. Specimens have been found in New York, New Jersey, Indiana, Kentucky, Alabama, Missouri, Kansas, Texas, and other states, and as far as lat. 65° N. According to Owen, the mastodons were elephants with molars less complex in structure and adapted for coarser vegetable food, ranging in time from the Miocene to the Upper Pliocene, and in space throughout the tropical and temperate latitudes. The transition from the mastodon to the elephant type of dentition is very gradual.

Masudi (mā-sô'dê), Abul-Hasan Ali ben Husein ben Ali, abt. 890-956; Arabian scholar; b. Bagdad; belonged to a family illustrious from the time of Mohammed, and attained a universality of erudition which has been equaled by no other Arab. He traveled extensively, and wrote several works, the most important of which is his "History of the Times," an immense general history, which has never been printed; no copy of it exists in Europe. His second work, "Book of the Middle," treated curious questions in history, geography, philosophy, and the sciences; copies of it are very rare and unknown in Europe. His smaller history, "Meadows of Gold and Mines of Gems," has been translated into English and French.

Masulipatam, city of Kistna district, Madras, British India; at the mouth of a branch of the Kistna delta; 220 m. N. of the city of Madras; is the center of a manufacture of textile fabrics; also the center of the Christian missions in the Telugu country. The French possessed the city from 1660 to 1669, and there still remains a small patch of French territory (22 acres) in the city, where a market is held,

besides two or three small patches outside. Pop. (1901) 37,000.

Mat, Maa, or Mait, Egyptian goddess, "daughter of Ra" the sun god, "eye of Ra," "mistress of heaven, queen of earth, mistress of the nether world," "queen of gods and goddesses." She was sometimes represented as the wife of Thoth, and was regarded as the impersonation and goddess of truth and justice. In the judgment scene in Amenti she is represented as weighing the heart of the departed against the symbol of truth. Her sign was the ostrich feather, which she wore on her head when standing, and sometimes on her knees when sitting.

Mat, or Mat'ing, coarse fabric made by weaving strips of the inner bark of trees, flags, rushes, husks, straw, grass, rattans, or similar materials, and used for covering floors, for beds, sails, packing of furniture and goods, and a variety of other purposes. The grass mats of the S. Sea Islanders are often of great beauty from their fineness and the brilliant colors of their dyes. The Japanese cultivate a peculiar species of rush for making mats of great softness and elasticity. The Chinese make rattan floor mats of all sizes, also rush floor mats, and table mats of rattans and rushes, all of which are exported. In Europe mats from reeds and rushes are largely produced in Spain and Portugal; and in Russia the manufacture is a prominent branch of national industry. The material there employed is the bark of the lime or linden tree, and the mats are known in Europe as "bast" mats. See CARPET; RUG.

Matabeleland (mät-ä-bél'länd), one of the two provinces of S. Rhodesia, British S. Africa; traversed by the Matoppos and Izimunte Mountains and watered by tributaries of the Zambezi, Lunli, and Limpopo rivers; has extensive forests and fertile plains; produces cereals, cotton, sugar, gold, and other minerals, and has a large cattle and sheep industry; chief town, Bulawayo, connected by rail with Cape Town; pop. (1907) native, 217,470; European, 7,654. See MASHONALAND.

Matan'zas, capital, of province of same name, Cuba; on bay of same name on N. coast; 52 m. E. of Havana, with which it is connected by rail; is the second port in Cuba in importance; was founded 1695; near by is the cavern of Bellemar, noted for its great stalactites. Pop. (1907) 239,812.

Match, small stick of combustible material furnished with some inflammable composition, and used for producing fire. In 1680 Godfrey Hanckwitz discovered that phosphorus rubbed between folds of brown paper would take fire and ignite a stick which had been dipped in sulphur. This was the earliest form of the common match. Another form, called chemical matches, were small sticks of wood dipped first in sulphur, and then in a composition of chlorate of potash, flowers of sulphur, colophony, gum or sugar, and cinnamon for coloring. The match, being dipped into sulphuric acid, was instantly ignited by the chemical action induced between the acid and chlorate of

potash. In 1829 John Walker, chemist, at Stockton-upon-Tees, England, invented the lucifer match. In his experiments on chlorate of potash he found that this could be instantly ignited by friction, as in rapidly drawing a stick coated with it and phosphorus by means of mucilage or glue through folded sand paper. Faraday, hearing of Walker's matches, brought them into public notice. The best wood for matches is clear white pine. It is first sawed into blocks of uniform size, and the length of two matches. These are afterwards slit by machines without loss of material into splints. They are then dipped in melted sulphur, and afterwards in phosphorous composition. Round matches are formed in England by forcing the wood endwise through holes in plates.

In American factories tubes are employed whether for round or square splints. The perforations are made as near together as possible, only leaving enough of the metal between to give the necessary strength for cutting. This invention was patented in England by Reuben Partridge, 1842. In "safety matches" a part of the combustibles, as the phosphorus, is placed on one surface, as a piece of sand paper, while the other part, containing chlorate or nitrate of potash, is placed on the tip of the match. The match will not ignite by friction against any surface but the one thus prepared. Machinery is largely employed in the manufacture of matches, and the number produced annually is beyond computation; two European manufacturers are said to make (together) nearly 45,000,000,000 matches each year, and it has been roughly estimated that there are 200,000,000 matches consumed daily in Great Britain, or about eight per head of the whole population. Applying this estimate to the U. S., the daily consumption would be the enormous total of 520,000,000. According to the census of 1909 there were 26 manufacturers of matches in the U. S., having an aggregate capital of \$11,953,000, who produced goods valued at \$11,353,000.



YERBA MATÉ.

Maté (mä'tä), or Paraguay (pä-rä-gwä') Tea, leaves of a native holly found in S. America,

an infusion of which is drunk by the people as tea is by Chinese and Europeans. The leaf and the drink are called *maté*, the aboriginal name for the cup used in preparing the infusion. The flavor is quite unlike that of tea, but it is greatly enjoyed by those accustomed to it. The physiological effects resemble those of coffee. The plant, called *yerba maté*, is the *Ilex Paraguayensis*, a holly which grows upon the banks of rivers in Paraguay and in the mountains of Brazil; it is a tree 15 or 20 ft. high, and when allowed to develop itself forms a handsome head.

Mat'e'rialism, in general, the doctrine that nothing exists but matter with its sensible properties. It is opposed to idealism, the doctrine that nothing exists but mind. As a metaphysical doctrine materialism has been practically abandoned in contemporary philosophy. It is now active as a theory only in psychology. In practice, however, what is called "materialism of life" was never more aggressively real. It is in fact rather to the absence of philosophy or of clear thinking and the desertion of high ideals of thought and conduct that this phrase has so common and so pertinent application in modern commercial, literary, and social life. See IDEALISM.

Mathema'tics, science which reasons about the relations of magnitudes and numbers, considered simply as quantities admitting of increase, decrease, and comparison. It is divided into three great branches, arithmetic, algebra or analysis, and geometry. Arithmetic is the branch which is concerned with the properties and relations of numbers, especially whole numbers; but when these relations are reasoned about, it is necessary to use algebraic symbols to express numbers, and thus the notation of algebra comes in. Algebra, or analysis, in itself reasons about quantity in general, expressed by means of symbols, without any relation to the particular kind of quantity. In modern mathematics algebra and geometry run together, because geometrical conceptions are found to be necessary in the development of algebra, while the theorems of the most advanced geometry can be expressed only in algebraic language. See ALGEBRA; ARITHMETIC; GEOMETRY.

Math'er, Cotton, 1663-1728; American clergyman; b. Boston, Mass.; son of Increase Mather; was ordained his father's colleague over the North Church, Boston, 1685; labored with great zeal as a pastor, endeavoring also to establish the ascendancy of the churches and ministry in civil affairs; was conspicuously connected with the witchcraft proceedings in Massachusetts; author of "Memorable Providences Relating to Witchcraft," "Wonders of the Invisible World," "Essays to Do Good," "Magnalia Christi Americana," and other works, large and small, numbering 382.

Mather, Increase, 1639-1723; American clergyman; b. Dorchester, Mass.; son of Richard Mather; pastor of the North Church, Boston, from 1664 till death; president of Harvard College, 1685-1701; led in opposing the abrogation by Charles II of the Massachusetts

charter; was in England during the revolution of 1688, and procured in England, 1692, a new charter for Massachusetts, under which he was given the power of naming the governor, lieutenant governor, and council; opposed the severe punishment of witches; was the author of publications, large and small.

Mather, Richard, 1596-1669; English clergyman; b. Lowton, Lancashire; after preaching fifteen years was suspended for nonconformity, 1633; was pastor in Dorchester, Mass., from 1636 till death; author of several theological treatises; father of six sons, four of whom were distinguished clergymen.

Math'ew, Theobald (best known as FATHER MATHEW), 1790-1856; Irish temperance reformer; b. Thomaston, Tipperary; was ordained in Roman Catholic Church, 1814; distinguished himself in cholera epidemic in Cork, 1832; organized the first total abstinence society in Cork, 1838; afterwards traveled over all parts of Great Britain and Ireland, induced hundreds of thousands to sign the temperance pledge, and labored with great success in the U. S., 1849-51.

Math'ews, Charles, 1776-1835; English actor; b. London; went on the stage as an amateur, and, 1794, as comedian of the regular company at the Theater Royal, Dublin; made his first appearance in London, 1803, as *Jubal* in "The Jew"; 1818, introduced his "At Home," and on his return from a successful trip to the U. S. appeared in his specialty, a "Trip to America," which was well received.

Mathews, Charles James, 1803-78; English actor; b. Liverpool; son of the preceding; achieved remarkable success on his first appearance in public in "The Hunchbacked Lover"; 1838, married Madame Vestris, at the time lessee of the Olympic Theater; they visited the U. S., and on their return to England managed the Covent Garden and Lyceum theaters. Mathews again visited the U. S., 1858, and married Mrs. Davenport, better known as Lizzie Weston; 1860, introduced a similar entertainment to his father's "At Home," in which his wife assisted; 1863, made a successful professional trip to Paris, and, 1869-72, visited the U. S.

Mathura (mā'thō-ā). See MUTTRA.

Mat'ins, specifically, the early morning service in the Roman Catholic Church, as distinguished from vespers or evensong.

Matsmai (māts-mī'), or **Fukuyama** (fū-kū-yā'mā), town of Japan, island of Yeso; 42 m. SW. of Hakodate; was till 1868 the center of Japanese civilization and trade in Yezo, but the departure of its lords and the growth of Hakodate have reduced it in importance. The castle, on an eminence commanding the town, is now used for an elementary school, and its grounds for a public garden. The last struggles of the adherents of the Tokugawa party, 1868, were made in and around the town.

Matsys (māt-sīs'). See MASSYS.

Mattapony (māt-ā-pō-nī') River, stream in Virginia which unites with the Pamunkey to

form the York River; is itself formed from the union of four streams—the Mat, the Ta, the Po, and the Ny.

Mat'tawa River, tributary of the Ottawa; rising near Lake Nipissing, in Trout Lake, Canada; passes through a series of picturesque small lakes and rapids, all of them, with their tributaries, well stocked with fish; after a course E. of 50 m. through Nipissing Co., falls into the Ottawa at Mattawa town.

Mat'terhorn, Mt. See CERVIN, MONT.

Matteucci (măt-tă'ôt-chê), Carlo, 1811-68; Italian savant; b. Forlì; became Prof. of Physics at Ravenna, 1837, and at Pisa, 1840; constructed the first telegraph in Tuscany, 1846; became superintendent of the telegraph service, and a senator, 1848; subsequently held the same position under the royal government of Italy; minister of education, 1862. His principal works are on the phenomena of electro-physiology, physics, electricity applied to the arts, and the physico-chemical phenomena of living bodies.

Matth'ew, Saint, one of the twelve apostles and author of the first Gospel; was a son of Alpheus, and a receiver of customs at the Lake of Tiberias. After the ascension of Christ, Matthew was at Jerusalem with the other apostles. Then history loses sight of him, though he is supposed to have preached fifteen years in Jerusalem, and then to have traveled and suffered martyrdom in Persia. Day in the Roman Catholic Church, September 21st; in the Greek, November 16th. The Gospel of Matthew, according to tradition, was composed in Hebrew. Following Erasmus, many eminent Protestant theologians, as Calvin, Beza, Lightfoot, De Wette, and Ewald, and among Roman Catholics Hug, have advocated the originality of the Greek text. The Gospel was undoubtedly written for Christians of Jewish descent in Palestine. A majority of modern writers seem to agree in fixing its date between 60 and 67. Its chief aim is evidently to prove the Messianic character of Jesus.

Matthew Par'is, or **Matthew of Paris** (so called from his having studied in that city), abt. 1195-1259; English historian; from 1217 was a Benedictine monk of St. Albans, where he continued the "Flores Historiarum" of Roger of Wendover from 1235 to 1259, adding a nearly equal amount of his own to the original. This, known as the "Historic Major," was first printed, 1571. He made a compilation from it, 1066 to 1253, known as the "Historia Minor," the "Chronicon," and the "Liber Chronicorum," which Sir Frederick Madden published under the title "Historia Anglorum," 1866. Through a subsequent continuation at Westminster the name Matthew of Westminster came to be attached to this whole work.

Matthias (mă-thl'ās), Saint, twelfth apostle, in place of Judas Iscariot; chosen during the ten days between Ascension and Pentecost. Of the 120 disciples in Jerusalem, apparently only two (Barsabas and Matthias) could be found who had been companions of Christ during the

whole course of His ministry; and of these two the latter was chosen somehow by lot. In spite of specious arguments against it, the validity of this election can be sustained. The New Testament makes no further mention of Matthias, and ancient traditions clash.

Matthias, 1557-1619; Emperor of Germany; son of Maximilian II; in 1577 repaired secretly to the Netherlands, and made an attempt at managing affairs there, but failed, and withdrew, 1580. On June 14, 1612, he succeeded his brother, Rudolph II, as Emperor of Germany, but his reign was very unsuccessful. The differences between the Protestant Union, formed 1608, and the Catholic League, formed 1609, grew into open controversies. The emperor first tried to put himself at the head of the Catholic League, but, failing in this, he undertook to suppress both associations by an imperial decree, to which, however, neither of them paid any attention. In 1617 the bigoted Archduke Ferdinand was appointed King of Bohemia, and on May 23, 1618, the Protestant inhabitants of Prague took arms and broke out in open rebellion. Thus began the Thirty Years' War. Hardly a year after the emperor died, and was succeeded by Ferdinand.

Matto Grosso (măt'tō grōs'sō), state of Brazil; second largest in the republic, and most thinly settled of all; area, 532,683 sq. m.; pop. (1900) 118,525; capital, Cayaba; borders on Paraguay and Bolivia, and forms the W. portion of the highlands of Brazil, comprising the low Amazon-Paraguay watershed, from which several minor chains stretch N. and S., separated by deep valleys and immense plains covered with dense forests. The Tapajos and Xingú rivers rise in the central portion and flow N. to the Amazon, while the Paraguay flows S. The Guaporé or Iténez and the Madeira are on the W. border, and the Araguay and Paraná on the E. Gold is found in nearly every direction; but the mines, like those of diamonds, are now mostly abandoned. Copper, iron, and many other metals abound in the hills. The principal exports are hides, ipecacuanha and other drugs, and balsams. Millet, rice, and manioc are cultivated, as are also sugar, tobacco, and cotton.

Mauch Chunk (māk chūnk'), capital of Carbon Co., Pa.; on the Lehigh River and Canal; 46 m. W. by N. of Easton; lies between the Mahoning and Sharp Mountains; is almost entirely surrounded by mountains and high hills; is the most important anthracite coal-trade center in the U. S.; and is popularly noted for its "switchback railway." The mines on Sharp Mountain are among the oldest and most productive in the state. Formerly coal was conveyed from the top of the mountain to the chutes in the borough by means of the switchback railway, on which the cars descended by gravity. The cars were hauled back first by mule power, and afterwards by cables operated by stationary engines at the different inclines. Subsequently a tunnel at Nesquehoning took the place of this method of transportation, and the old gravity road is now used exclusively for pleasure excursions. Mts. Pisgah and Jef-

ferren, reached by the "switchback"; Prospect Rock, Flagstaff Peak, and Glen Onoko are points of popular interest. Pop. (1910) 3,952.

Maui (mow'ē). See HAWAII.

Maule (mow'la), river of Chile, rising in the Andes, flowing W. and entering the Pacific in lat. 35° 18' S.; length, about 140 m.; navigable for about 50 m.

Mauna Loa (mow'nā lō'a), largest active volcano in the world; nearly in the center of the island of Hawaii. Its snow-crowned dome rises 13,600 ft. above the level of the sea. It contains several craters. Those on the summit form an immense abyss, 1½ m. in diameter and 1,000 ft. deep.

Maundy (mān'dī) Thurs'day, same as the Holy Thursday in Passion Week. On this day, in Roman Catholic countries, the feet of pilgrims are washed in the church, while the "Mandatum novum" is sung, and doles are given to the poor.

Maupassant (mō-pā-sān'), Henri René Albert Guy de, 1850-93; French novelist; b. Miromesnil, Seine-Inférieure; after an indifferent education, went to Paris; was employed as clerk in Navy Department. Attracted to letters, he enjoyed the counsel of his uncle Flaubert, who was his master in the art of writing. Published "Des Vers," 1880, first volume of verse. His reputation was made rapidly. Published volumes in quick succession till 1892, when mental disease showed itself. He became an inmate of a private asylum, where he died. Among his collections of short stories are "La Maison Tellier," 1881; "Les Sœurs Rondoli," 1884; "Contes du jour et de la nuit," 1885; "La Horla," 1887; "Mont-Oriol," 1887; "La Petite Roque," 1888; "La Main Gauche," 1889; "L'Inutile Beauté," 1890; the novels, "Pierre et Jean," 1888; "Fort comme la mort," 1889; "Notre cœur," 1890; descriptions of travel "Au Soleil," 1884; "Sur l'eau," 1888; "La vie errante," 1890. His pictures are mainly of the human animal of robust appetite and rudimentary intelligence and conscience, observed with much penetration, and set forth in a clear, firm, and direct style.

Maurepas (mōr-pā'), Jean Frédéric Phélypeaux (Count de), 1701-81; French statesman; b. Versailles; inherited in his fourteenth year an office as Minister of State, and when twenty-four took charge of it. In 1749 he was banished from the court on account of a sarcastic epigram on Madame de Pompadour, but on the accession of Louis XVI he returned as Prime Minister and held the position till his death. His most famous measures were the convocation of the parliaments and the alliance with the N. American colonies in the Revolutionary War, both of which had a decisive influence in bringing about the French Revolution.

Maurice (mā'riss), COUNT OF NASSAU, PRINCE OF ORANGE, 1567-1625; stadtholder; b. Dillenburg, Dutch Nassau; son of William the Silent, of Orange; was proclaimed stadtholder

of Holland, Zealand, and Utrecht shortly after the assassination of his father, 1584, and appointed commander in chief by all the provinces after the recall of Leicester by Queen Elizabeth, 1587. He took Breda, 1590, Zutphen, Deventer, and Nymwegen, 1591, Geertruidenberg, 1593, Groningen, 1594. In 1597 he defeated the Spaniards at Turnhout in Brabant, and in 1600 at Nieuwport, near Ostend. He opposed the armistice of twelve years which Barneveldt concluded with Spain, 1609, and by which the United Provinces were acknowledged as an independent republic; aspired to sovereignty; and in the controversy between the Arminians and the Gomariists favored the latter as a means of overcoming the resistance of Barneveldt and the republican party. His success was but temporary. Barneveldt was executed, 1619, but the popularity of Maurice was lost, and it was hardly regained by some new exploits in the renewed war with Spain, 1622.

Maurice, DUKE OF SAXONY, 1521-53; German general; b. Freiberg; son of Henry the Pious; joined the Protestant Church, 1539; married, 1541, a daughter of the Landgrave Philip of Hesse, and succeeded his father on the ducal throne in the same year. He fought the army of Charles V against the Turks and against the French, and although he was an ardent Protestant, ranged himself with the enemies of his religion, invaded the territories of his cousin, the Elector John Frederick, and finally helped the emperor to defeat the latter in the battle of Mühlberg, 1546. As a reward Maurice received from the emperor the electorate and all of John Frederick's possessions. As soon, however, as Maurice had realized his aim, the good relations with the emperor ceased. Magdeburg was still under arms, and the work of reducing it was intrusted to Maurice. Gathering a large force for the ostensible purpose of besieging the city, he made a secret alliance with Henry II of France, 1551, and, 1552, marched on Innsbruck, where the emperor lay ill of the gout. By a hasty flight the emperor saved himself from being captured, but by the Peace of Passau, 1552, he was compelled to consent to all his demands, the first of which was religious liberty for the Protestants. Next year, July 9, 1553, Maurice was mortally wounded in the battle of Sievershausen against the Margrave of Brandenburg. He was succeeded by his brother.

Mauricius (mā-rish'ūs), Flavius Tiberius, abt. 539-602; Emperor of Constantinople; b. Arabissus, Cappadocia; because of his high character and eminent services in the wars against Persia was by the Emperor Tiberius II appointed the latter's successor, 582. Constant and sometimes unsuccessful wars with the Avars and Persians, together with mutinies and conspiracies, filled his reign. His gentleness provoked contempt; at last, a general named Phocas excited a simultaneous revolt in the army and capital, and seized the crown. Mauricius fled with his family to Chalcedon, where he was discovered and beheaded by the tyrant's order, together with his five grown-up sons.

Maurita'nia, ancient name of NW. Africa, corresponding to the present Morocco and part of Algeria, and inhabited by the Mauri (Moors). After conquering it, the Romans founded many colonies here. In 429 A.D. it was overrun by the Vandals, but it was reconquered by Belisarius, and remained with Italy till the end of the seventh century, when it was taken by the Arabs.

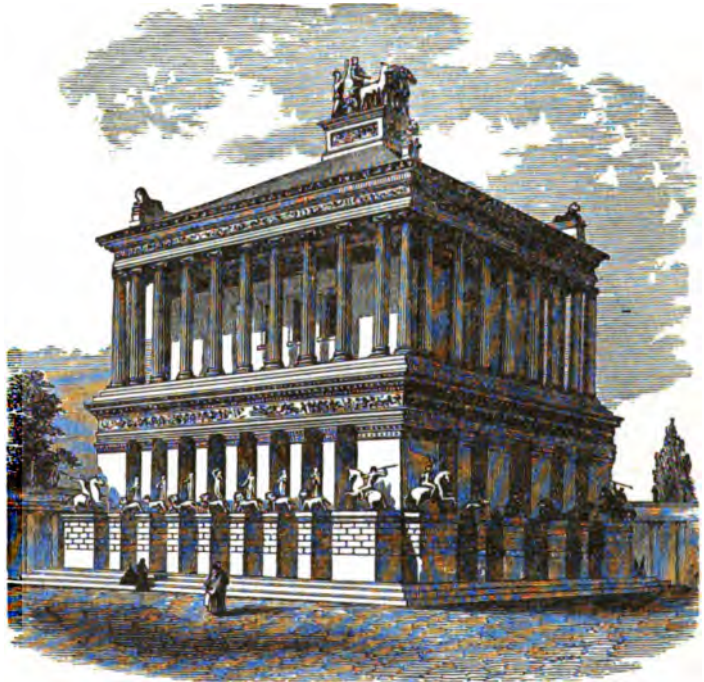
Maurit'ia, genus of American fan-leaved palm trees, usually very tall and beautiful. Palm wine, edible fruits, and useful timber and leaves are produced by *Mauritia vinifera* and *fluviatilis*.

Mauritius (mā-rish'ŷ-ŷs), formerly ILE DE FRANCE, one of the Mascarene Isles; in the Indian Ocean; 550 m. E. of Madagascar; belonging to Great Britain; area, 705 sq. m.; pop. (1901) 378,195. It is of volcanic origin, surrounded with coral reefs, and covered with mountains, not very high—the Montagne de la Rivière Noire (the highest in the island) reaches 2,707 ft. The valleys contain a very rich soil, and the climate is singularly fine, the heat seldom exceeding 90°. The island was discovered, 1507, by the Portuguese, and colonized, 1598, by the Dutch, who soon left it. In 1712 it was colonized a second time by the French, who kept it till 1810, when it was taken by the British. Sugar is the principal product, cultivated by coolies brought from India for this purpose. Coffee and rice are extensively cultivated. The colony of Mauritius includes also the islands of Rodrigues, the Seychelles, Amirantes, Chagos, and Oil groups, and other smaller islands. The capital is St. Louis, on Mauritius.

Maury (mō-rē'), Matthew Fontaine, 1806–73; American hydrographer; b. Spottsylvania Co., Va.; entered the U. S. navy as midshipman, 1825; became a lieutenant, 1836; keeper of charts and instruments at Washington, 1842–44; superintendent of the National Observatory, 1844–61, and commander, 1855–61, resigning to enter the Confederate service, in which he attained the rank of commodore. After the Civil War he served as commissioner of emigration under the Archduke Maximilian in Mexico; later resided in England and Russia, engaged in preparing a series of textbooks; became Prof. of Physics in the Virginia Military Institute; author of "Treatise on Navigation," "The Wind and Current Charts," and "Sailing Directions," issued by the Na-

tional Observatory; "The Physical Geography of the Sea," etc.

Mausole'um, tomb of Mausolus, Satrap and King of Caria; erected at Halicarnassus by Artemisia, his widow, 353 B.C. It is referred to by ancient writers as one of the Seven Wonders of the world, and it surpassed all other structures of the kind so much by its magnificence that the name of mausoleum came to be the generic term for a costly tomb. In 1857 excavations, undertaken under the aus-



TOMB OF MAUSOLUS.

pices of the British Govt., brought to light the site and fundamental outlines of the building, and many fragments were found. The sculptures, including the statue of Mausolus, unearthed at that time, are now in the British Museum. See TOMB.

Mausolus, d. abt. 353 B.C.; Satrap of Caria; son of Hecatomnus; married his own sister, Artemisia, and succeeded his father as Satrap of Caria, which he ruled for twenty-four years. He enlarged his dominion, and removed the seat of government from Mylasa to Halicarnassus; threw off the Persian yoke, supported the oligarchy in Rhodes, and induced Rhodes, Chios, etc., to revolt from Athens; was a patron of literature, art, and science. Theodectes, the poet, wrote a tragedy entitled "Mausolus" in his honor, the first historical tragedy ever written. Mausolus was succeeded by his wife, who ruled over Caria, 353–351 B.C.

Mavrocordatos (māv-rō-kōr-dā'tōs), Alexander, 1791–1865; Greek soldier and statesman;

b. Constantinople; nephew of John Caradja, Hospodar of Wallachia; organized, 1821, the insurrection against the Ottoman Govt. in Ætolia and Acarnania; expended his fortune in the cause; became president of the Executive Council, which promulgated a declaration of independence, 1822, and drew up the provisional constitution. He distinguished himself in several battles, and at the defense of Missolonghi, Navarino, and Sphacteria. Mavrocordatos was head of the ministries of 1833, 1841, 1844, 1854, and in the intervals filled various positions as ambassador.

Maxen'tius, Marcus Aurelius Valerius, d. 312; Roman emperor; son of Maximianus, son-in-law of Galerius, and brother-in-law of Constantine. On the division of the empire, 305, he received nothing, but was made emperor by an insurrection at Rome the following year. Of the rival emperors, he put Severus to death, defeated Alexander in Africa, and banished his father Maximianus. Soon, however, he declared war against Constantine, alleging as his reason that Constantine had caused the death of Maximianus. Defeated at Saxa Rubra, he endeavored to reach Rome, but was drowned in the Tiber.

Maximilian I, 1459-1519; Emperor of Germany; b. Neustadt, near Vienna; succeeded his father, Frederick III, 1493; married, 1477, Mary, daughter and sole heiress of Charles the Bold, thus securing Burgundy for his house; after her death, married, 1493, Bianca Sforza, daughter of Galeazzo Maria, Duke of Milan, deceased, and then became involved in wars with Venice, Milan, the pope, Naples, France, and Spain. His Italian campaigns were of little consequence, and he failed to hold Switzerland within the empire, but he was successful in aggrandizing the house of Austria. The marriage of his son Philip with the Infanta Joanna, 1496, united Spain to the possessions of the house of Hapsburg, and he laid the foundation for the annexation of Hungary to the Austrian crown by marrying his grandchildren into the royal family of that country. In 1495 he established the imperial chamber (*Reichskammergericht*), and in 1501 the imperial Aulic Council.

Maximilian II, 1527-76; Emperor of Germany; b. Vienna; succeeded his father, Ferdinand I, 1564. Although he had spent several years at the court of Madrid, he was favorable to the Reformation. Protestants were appointed to government offices in Austria; the evangelical theologian, Chytraus, of Rostock, was called to Vienna to arrange the Protestant service, and the Jesuits were allowed free scope for their activity.

Maximilian, Ferdinand Maximilian Joseph, 1832-67; Archduke of Austria and Emperor of Mexico; b. Vienna; second son of the Archduke Francis Charles. In 1854 he became rear admiral and chief of the navy, and, 1857, governor of the Lombardo-Venetian Kingdom. The same year he married the Princess Charlotte, daughter of Leopold I, King of the Belgians. In 1864 he accepted, at the instance of Napoleon III, the crown of Mexico, under the name

of Maximilian I, with the consent of that portion of the people of Mexico whose sanction could be secured through French influence. He landed at Vera Cruz, May 28th. One of his first measures was to adopt a son of the Emperor Iturbide as his presumptive successor on the throne. He was confronted by formidable difficulties, which increased in proportion to the determined resistance of Pres. Juarez and of the mass of the Mexicans, encouraged by the dissatisfaction of the U. S. with European encroachments on the American continent. The Empress Charlotte in vain attempted, 1866, in interviews with Napoleon in Paris and with the pope in Rome, to change the current of events, and finally became insane. Napoleon at length found himself compelled to withdraw the French troops, 1867. Maximilian refused to abdicate; was besieged in Querétaro by Gen. Escobedo and captured, May 15th; sentenced to death by court martial and shot. His remains were conveyed to Vienna and interred in the imperial vault. His miscellaneous writings were published in 1867.

Maximinus (măk-sî-mî'nūs), Caius Julius Verus, d. 238; Roman emperor; b. of barbarian parentage; enlisted in the cavalry, and was promoted by Caracalla; was intrusted by Alexander Severus with the organization of a corps for an invasion of Germany, and was proclaimed emperor by this army on the assassination of Severus, 235. His campaigns against the Germans were successful, but his suspicion, rapacity, and cruelty knew no bounds. An insurrection in Africa and the sympathy it found in Italy threw him into a fit of frenzy. He hastened across the Julian Alps, but was stopped at Aquileia, and while besieging this city was killed by his own soldiers.

Max Müller. See MÜLLER, FREDERICK MAX.

Max'well, James Clerk, 1831-79; Scottish physicist; b. Edinburgh; was Prof. of Natural Philosophy at Aberdeen, 1856-60, and in King's College, London, 1860-65; became Prof. of Experimental Physics at Cambridge; constructed a theory of electricity, in which the mysterious and unmeaning "action at a distance" has no place; devoted attention to the perception of color, and was the first to make color sensation the subject of measurement; made many investigations on the kinetic theory of gases; discovered that viscous fluids, while yielding to stress, possess double refraction; and published a great number of papers, and "Essay on the Stability of the Motion of Saturn's Rings," "Theory of Heat," and "Treatise on Electricity and Magnetism."

Maxwell, Sir William Stirling, 1818-78; Scottish author; b. Kenmure; was known by the name of Stirling until 1866, when by the death of Sir John Maxwell, his maternal uncle, he succeeded to a baronetcy and assumed the name of Maxwell; was rector of the Univ. of St. Andrews, 1863, of that of Edinburgh, 1872, and elected chancellor of that of Glasgow, 1875; works include "Annals of the Artists of Spain," "Cloister Life of Charles V.," and "Velasquez and his Works."

May, Thomas, 1594-1650; English historian and poet; b. Mayfield, Sussex; son of Sir Thomas May; became a favorite at court; published poetical translations of Vergil's "Georgics" and Lucan's "Pharsalia," to which he added a continuation, also in verse; produced five dramas, and the historical poems, "The Reign of King Henry II" and "The Victorious Reign of King Edward III." He became secretary and historiographer to the Long Parliament; published "The History of the Parliament of England which began November 3, 1640," "A Breviary of the History of the Parliament of England," the poetical portions of John Barclay's famous allegorical romance, the "Argenis," etc.

May, Sir Thomas Erskine (BARON FAENBOUGH), 1815-86; English jurist and historian; entered the civil service, 1831; was for more than forty years in the service of the House of Commons in different capacities, becoming clerk, 1871; knighted, 1866; was raised to the peerage, 1886. He published "A Treatise on the Law, Privileges, Proceedings, and Usage of Parliament"; reduced to writing for the first time, 1854, the "Rules, Orders, and Forms of Proceeding of the House of Commons"; author also of "Constitutional History of England since the Accession of George III," "Democracy in Europe: a History," etc.

May, fifth month of the year, consisting of thirty-one days. Among the Romans it was sacred to Apollo. On the 9th, 11th, and 13th days was celebrated the festival of the *lemuria* in memory of the dead. From the ancient *Floralia*, or festival in honor of Flora, celebrated from April 28th to May 2d, is perhaps derived the mediæval and modern custom of observing May 1st (Mayday) with festive and floral rites. The Druids were accustomed to light large fires on the summits of hills on the eve of May.

Māyā (mā'yā), Sanskrit term employed in different senses in the Puranic mythology, in the Buddhistic legends, in the Vedānta philosophy, and in some of the modern sectarian theologies of India. Originally it was the name of a goddess, the wife of Brahma, who, through her, created the universe; hence when the universe came to be regarded as unreal, its creation was necessarily the work of illusion, which being personified in the goddess, her name became in late Sanskrit a synonym for "illusion," and it has preserved nearly the same mythical sense in the modern theologies.

Mayagüez (mī-ā-hwēs'), town and port of call of the island of Porto Rico; on a bay of the W. coast; 70 m. WSW. of San Juan. The harbor is large and shallow, steamers anchoring a mile from the shore. The principal exports are coffee and oranges. Pop. (1899) 15,187.

May Ap'ple, common name of a perennial herb, indigenous to the U. S. (the *Podophyllum peltatum*), now recognized as belonging to the *Berberidaceæ*. From a perennial creeping rhizome a slender stem about a foot high rises, which forks near the top into two petioles,

each surmounted by a large peltate leaf. At the crotch of the division appears a solitary white flower. The fruit of the may apple is yellowish and fleshy, and about the size of a pigeon's egg. It is somewhat acid and mawkish in flavor, but may be eaten freely. The dried rhizome constitutes the drug *podophyllum*.

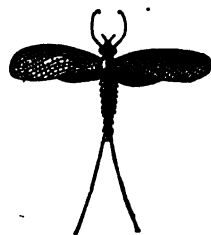
May Bee'tle. See COCKCHAFFER.

Mayence (mā-āns'). See MAINZ.

Mayer (mī'ér), **Johann Tobias**, 1723-82; German mathematician; b. Marbach, Württemberg; became Prof. of Mathematics and Director of the Observatory at Göttingen, 1750. His "Zodiacal Catalogue," comprising 998 stars, and his "Lunar Tables" are valuable. His most important discovery was the principle of the "repeating circle."

Mayer, Julius Robert, 1814-78; German physicist; b. Heilbronn, Württemberg. In 1840 he made a voyage to Java, where his medical practice drew his attention to the question of animal heat. From his observations he inferred that the heat generated externally must stand in a fixed relation to the work expended in its production. He then sought to express this relation numerically. He became town physician of Heilbronn, and in 1842 contributed to Liebig's *Annalen* a paper entitled "Bemerkungen über die Kräfte der unbelebten Natur," which contained the germ of his future labors. In a memoir published 1845 he expanded and illustrated the physical principles laid down in his first paper, applying them to organic nature. In his "Beiträge zur Dynamik des Himmels," 1848, he applied the same principles to the heavenly bodies. In "Bemerkungen über das mechanische Aequivalent der Wärme," 1851, he developed still further the mechanical theory of heat.

May Fly, common name of several species of *Ephemera*. The entire period of the preparatory stages the May fly passes in the water, during which time the larvæ and pupæ make little burrows in the sides of the pond or stream in which they live. The emerging of these insects from the water seems always to take place in the evening, and they generally make their appearance in countless swarms for two or three evenings. By the next morning most of these insects are found lying dead in heaps on the shore.



MAY FLY.

May'hem, by the common law, consists of violently depriving a person of the use of any of his limbs or members which may be used in fighting, so that he is rendered less capable of protecting himself; but an injury which merely causes disfigurement is not a mayhem. In modern times, however, this common-law rule has been changed in some states by statute, and injuries merely causing disfigurement

have been declared acts of mayhem. Mayhem was in ancient times punished by a mode of retaliation, the person inflicting the injury being deprived of the same member of which he had deprived another, or being disabled in a like manner; but this practice went out of use at an early period, and the offense was punished by fine and imprisonment.

May'hew, Henry, 1812-87; English humorist; b. London; founded a comic paper, *Figaro in London*; assisted in founding *Punch*, 1841, and for some years was its chief editor. With his brothers, Horace and Augustus, he produced a series of humorous novels and Christmas stories by the "Brothers Mayhew," including "The Image of his Father," "The Good Genius that turned Everything into Gold," and "Whom to Marry and How to Get Married."

May Laws, The. See FALK LAWS, THE.

May'o, Richard Southwell Bourke (Earl of), 1822-72; British statesman; b. Dublin, Ireland; member of Parliament, 1847-66; Chief Secretary for Ireland, 1852, 1858-59, and 1866-68; succeeded to his title, 1867; Governor General of India from 1868 till murdered by a Mohammedan convict while inspecting the penal settlement at Fort Blair, Andaman Islands.

Mazarin (mä-zä-rän'), Jules, 1602-61; cardinal and French statesman; b. Piscini, Italy; studied law in Spain; entered the Papal army, 1622; was employed in diplomacy; went to France to conclude a peace, 1630, and was induced to enter the French service by Richelieu, who procured for him a cardinal's hat, 1641. On the death of Richelieu, Mazarin became a member of the Council of State (1642), and on the death of Louis XIII (1643), Anne of Austria made him Prime Minister. He was soon opposed by a powerful party of nobles, as well as by the Parliament of Paris; the war of the Fronde followed; peace was restored, 1649, chiefly by the great Condé, who, with the Prince of Conti and the Duke of Longueville, was imprisoned by Mazarin's order; the latter was then banished by Parliament, and fled to Germany, where he continued to govern France. His last great achievement was his negotiation of the Peace of the Pyrenees with Spain, in which he secured an increase of French territory and the marriage of Louis XIV with the Spanish Infanta.

Mazatlan (mä-sät-län'), city and port, State of Sinaloa, Mexico; on a peninsula opposite the Bay of Olas Altas, and near the entrance to the Gulf of California; surrounding scenery is very beautiful, but the climate is hot; bay is deep and of easy access, but open to S. and SW. winds, during which it is unsafe; inner harbor does not admit deep-draught vessels; exports mainly silver ores, fruits, cabinet and dye woods, drugs, orchilla, and pearls. Pop. (1900) 17,852.

Mazep'pa, Jan, abt. 1645-1709; Hetman of the Cossacks; b. Podolia; became page at the court of John Casimir, King of Poland. On returning to his native province he formed an

improper intimacy with a married woman, whose husband caused him, according to the common story, to be tied to a wild horse, which carried him to the country of the Cossacks. His abilities soon gave him great influence there, and on the death, 1687, of the hetman Samoilovitch, whose secretary and adjutant he had been, he was chosen to the chief command. He attained to high favor with Peter the Great; but when the Russians began to encroach on the liberties of his adopted country, he joined Charles XII of Sweden, and after the defeat of Poltava (July 8, 1709) fled with him to Turkey.

Mazur'ka, dance in $\frac{3}{4}$ or $\frac{3}{8}$ time, having a peculiar and pleasant rhythm. From four to eight couples join in the mazurka, which is lively and sometimes rather grotesque. It was originally a Polish dance, but was by the music of Chopin spread over the whole of Europe.

Mazzini (mät-sén'), Giuseppe, 1808-72; Italian revolutionist; b. Genoa; was educated for the law; joined the Carbonari; was imprisoned; and on release organized at Marseilles the League of Young Italy. From this time he was engaged in continuous conspiracies and agitations for the liberation of Italy from foreign rule. In 1833 he was ordered to leave French territory and went to Switzerland; 1837 was requested to leave Switzerland and went to London; returned to Italy at Revolution of 1848; and fled again to Switzerland after the capitulation of Milan. In 1849 he became a triumvir of the newly proclaimed Roman Republic; on its speedy suppression by the French he fled to London; 1857, he instigated an insurrection in Sardinia and went to Genoa to direct it, but through popular apathy had to abandon it; and during the War of 1859 in Lombardy he constantly resisted the idea that Italy could be benefited by Napoleon's intervention. In 1865 he was elected to the Italian Parliament, but unwilling to take the oath of allegiance to a monarchy, as he desired Italy to be a republic as well as united, he remained abroad. He was captured during an insurrection in Palermo, 1870, but was released by the amnesty of the Italian Govt. after its occupation of Rome.

Mazzo'ni, Guido, d. 1518; Italian sculptor; b. Modena. His work is interesting in comparison with that of Luca della Robbia and his successors, being all, so far as known, in enameled and colored terracotta, of extraordinary realism and generally of life size. In the Church of San Giovanni Decollato at Modena is a surprising and impressive group of the dead body of Christ mourned by the disciples. In the crypt of the cathedral is a nativity, with four life-sized figures besides the child.

Mead, alcoholic drink made by fermenting a mixture of honey and water or the washings of honeycomb. It is sometimes flavored with aromatic substances. It is the same as hydromel and metheglin. It was a favorite drink among the Norse peoples of antiquity, and was known in ancient Greece and Rome.

Meade, George Gordon, 1815-72; U. S. army officer; b. Cadiz, Spain, where his father was U. S. navy agent; graduated at West Point, 1835; and served through the war with Mexico; made captain of engineers, 1856, and placed in charge of the surveys on the N. lakes. He was commissioned brigadier general of volunteers, August 31, 1861; took part in the principal battles of the Peninsular Campaign, 1862; commanded a corps in the Maryland Campaign; and was made major general of volunteers, November 29th. From December, 1862, to June 28, 1863, he was in command of the First Corps and afterwards of the Fifth Corps of the Army of the Potomac, and was engaged at Fredericksburg and at Chancellorsville. On June 28, 1863, he succeeded Gen. Joseph Hooker in command of the Army of the Potomac; and on July 1-3 fought the battle of Gettysburg. He was made brigadier general, U. S. army, July 3d. From May 4, 1864, to April 9, 1865, he was, under Gen. Grant, in immediate command of the Army of the Potomac. He was made major general, U. S. army, August 18, 1864; commanded various military departments till his death. There is a colossal equestrian statue of him in Fairmount Park and another in front of the city hall, both in Philadelphia, his home in last years.

Meade Riv'er, river of Alaska, flowing N. into the Arctic Ocean, SW. of Point Barrow; discovered by Lieut. Ray, 1883; it passes through a country rich in lakes, lagoons, marshes, and streams, covered in summer with abundant vegetation, but almost destitute of trees.

Meadow Lark, bird of the oriole family, having a handsomely variegated plumage of pale brown, streaked with dark brown and blackish. The under parts are bright yellow, and there is a black crescent on the breast which is merely indicated in the young. The



MEADOW LARK.

bird is not even a near relative of the lark, but possibly was called lark on account of its song, while meadow indicates its favorite haunts. The E. meadow lark is common in the E. U. S. W. of the Mississippi it is replaced by a paler race, while a darker-colored variety occurs in S. Texas and N. Mexico.

Meadow Mouse. See *ARVICOLA*.

Meadow Saffron, common name of a small perennial bulbous herb (*Colchicum autumnale*) of the natural order *Melanthaceae*, growing

wild in moist soil in England and middle and S. Europe. The mode of growth is peculiar. From the corm of one year there sprouts a new one, from which, late in the summer, a stem grows, bearing for that season only flowers. These are from two to six in number, and are of a lilac or light-purple color. The following spring the young plant matures, bearing leaves and fruit, and the old corm shrivels. The corm and seeds are used in medicine. Their virtues depend on a crystallizable principle called *colchicine*.

Meagher (mă'hér), Thomas Francis, 1823-67; American army officer; b. Waterford, Ireland; became a favorite orator with the Young Ireland Party of 1846-48; was sentenced to death for sedition; but the sentence was commuted to transportation for life; escaped from Tasmania, 1852, and settled in New York. He lectured with success in various parts of the U. S.; was admitted to the bar, and wrote for the press; became editor of *The Irish News*, 1856; elected captain, then major of the Sixty-ninth New York Volunteers, 1861; raised a brigade of Irish volunteers, 1862; commanded this brigade as brigadier general, 1862-63; left the brigade after the battle of Chancellorsville; was assigned, 1864, to the command of the district of Etowa; resigned, 1865; became secretary of Montana; was drowned at Fort Benton, Mont.

Meal'y Bug, destructive insect in green-houses, of the order *Hemiptera*, and family *Coccidæ* or bark lice, the *Coccus Adonidum*. Several broods are produced in a year. Many are destroyed by ichneumon parasites and devoured by birds. Alkaline washes are found most effectual in checking their ravages.

Mean, a term expressing a quantity lying between two other quantities, and connected with them by some mathematical law. There are several kinds of mean values, the principal ones being the *arithmetical mean*, the *geometrical mean*, and the *harmonic mean*.

(1) The *arithmetical mean* of two quantities is one half their sum; the arithmetical mean of several quantities is equal to their sum divided by their number; it is the same as their average. Thus we say that the mean temperature of a day is equal to the sum of the temperatures at every hour (or minute) of the day, divided by the number of hours (or minutes) in the day; and the mean temperature of a year is equal to the sum of the mean temperatures of every day in the year, divided by the number of days in the year.

(2) The *geometrical mean* of two quantities is the square root of their product; if several quantities form a geometrical progression, the first and last are called extremes, and all the others are said to be geometrical means between them. The ratio of the progression is equal to the n th root of the quotient of the last term by the first, $n + 1$ being the number of terms. Thus any ordinate of a circle is equal to the geometrical mean of the corresponding segments of the diameter.

(3) The *harmonic mean* of two quantities is the reciprocal of the arithmetical mean of the

reciprocals of the two quantities. Thus the harmonic mean of 6 and 12 is $1 \div \frac{1}{6} + \frac{1}{12}$, or 8. The harmonic means of two quantities is a third proportional to their arithmetical and geometrical means; that is,

$$\frac{a+b}{2} : \sqrt{ab} :: \sqrt{ab} : \frac{2ab}{a+b}$$

(4) The *arithmetico-geometric mean* is a mean of two quantities formed by taking their arithmetical and geometrical means, then the arithmetical and geometric means of these means, and so on. The two sets of means will approach the same limit, which limit is the arithmetico-geometric mean.

The method of geometrical means is used in solving many practical problems. Thus to find the rate per cent at which a sum of money will double in a given number of years, we regard the amounts at the ends of the successive years as terms of a geometrical progression, and then find the value of the corresponding ratio; this ratio (which is the annual amount per cent), diminished by 1, is the required rate. Let it be required to find the rate per cent at which a given sum of money will double in ten years; here there are 9 geometrical means to be inserted between 1 and 2, and by the rule we find the ratio equal to $\sqrt[10]{2}$, or to 1.0717; hence the required rate is .0717.

Measles (mæ'z'lz), contagious fever, attended with a characteristic eruption. It begins with the ordinary symptoms of fever, attended with inflammation of the mucous membrane lining the air passages; the eyes are red and watery; there is running from the nostrils, hoarseness, and cough. Small red spots on the mucous membrane of the mouth are an early sign of measles. The eruption, consisting of small dark red papules, roughly crescent shaped, commonly appears on the fourth day, at first about the head and neck, then on the trunk and arms, and finally on the lower extremities, taking two or three days to complete its course. The treatment consists in maintaining an equable temperature, avoiding chill, and a simple diet, with the occasional use of mild cathartics. The quarantine period after a child has been exposed to measles before he should be allowed to mingle with other children is sixteen days, and then he and his clothes, etc., should be thoroughly disinfected.

Measures. See WEIGHTS AND MEASURES.

Measuring Worm. See SPAN WORM.

Meaux (mô), town in department of Seine-et-Marne, France; on the Marne; 28 m. N.E. of Paris; is the see of a bishop, and has a fine cathedral with a monument of Bossuet, who was bishop here; has large manufactures of cottons, calicoes, sailcloth, vinegar, and salt-peter, and numerous flour mills on the Marne from which great quantities of flour are sent to Paris. Pop. (1901) 13,690.

Mec'ca. See MEKKA.

Mechanical Powers, certain elementary forms of mechanism in which the simplest possible

material connection between two points or surfaces is such that the action of a force applied at one point in a given direction is caused to overcome a resistance at another point in any required direction. "Mechanical power" implies also that an "advantage" is gained that a small force acting through a given

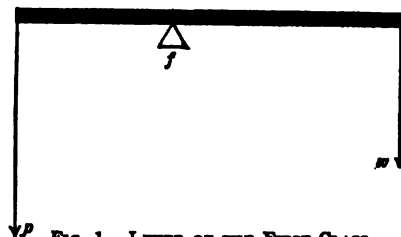


FIG. 1.—LEVER OF THE FIRST CLASS.

space may be made to overcome a greater force acting as a resistance through a less space. When increase of motion is the principal object, a force acting through a given space may overcome a less resistance acting through a greater space. Where a simple transfer of the direction or point of application of a force takes place, without any possible "advantage" in either of these respects, the mate-

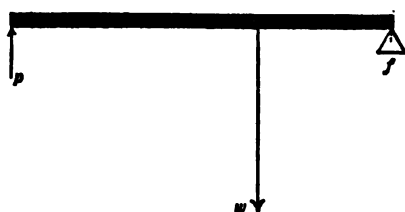


FIG. 2.—LEVER OF THE SECOND CLASS.

rial connection between the points of application of the power and resistance does not necessarily involve the employment of one of the elementary machines or mechanical powers. One general principle being sufficient for all—viz., that in any elementary machine the product of the force or effort into the distance passed over by its point of application must be equal to the product of the resistance

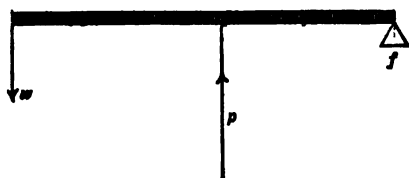
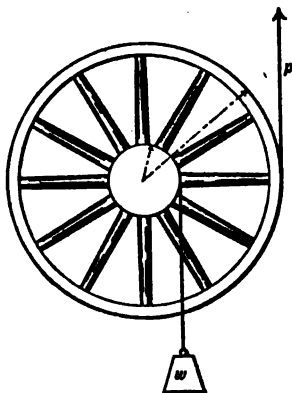


FIG. 3.—LEVER OF THE THIRD CLASS.

multiplied by the distance passed over by its point of application. If the force or effort be a liquid pressure acting on a surface, the resistance being a corresponding liquid pressure acting on a different surface, then the volumes through which the two surfaces move under the influences of the action and reaction must be equal. This latter enumeration of the general

principle is applicable especially to hydrostatic machines.

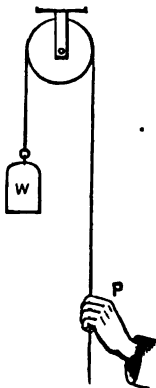
Under these general definitions and conditions all the elementary machines which are met with in mechanical constructions, or which



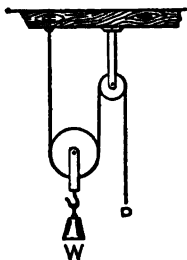
WHEEL AND AXLE.

are employed by man and animals in locomotion, may be arranged under four heads, each depending, for the calculation of the work performed by the moving force and the resistance, upon certain elementary theorems of mechanics. The classifications are the *lever*, the *inclined plane*, the *jointed links* (called also the funicular machine, and also the "toggle joint"), and the *hydrostatic press*. All machines of artificial construction and all movements of animals in locomotion depend on the action of these simple machines or mechanical powers, either in their elementary forms or in various combinations.

Ordinary machines, whether they be *prime*



SIMPLE PULLEY.

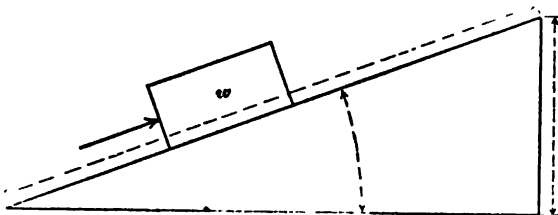


MOVABLE PULLEY.

movers—i.e., whether they receive directly and utilize the action of muscular force, the force of gravity acting through falling water, the wind, or the moving force of heat—or whether they be secondary machines driven by prime movers, are elementary machines, or combina-

tions of the elementary machines which have been named. They consist generally of a framework for sustaining and supporting the moving pieces, and certain connections between the moving pieces by which motion is communicated from one moving piece to another, or from the driving point to the working point. The principles according to which such motions are communicated are based on the laws of motion, and have been fully developed for all ordinary machines in modern works on the principles of mechanism.

The lever is based on the theorem of *moments of forces*, and involves a rotation of a material, rigid bar or form about a point called the fulcrum. The moment of a force is the product of the force measured in units of force (pounds), multiplied by the perpendicular distance from its line of action to the center of rotation, the fulcrum. Whatever be the directions of the effort or power, and the resistance, applied to two points of a lever, the products obtained by multiplying each by the perpendicular distance from its line of action to the fulcrum must be equal. The pressure upon the point of rotation in the fulcrum acts as a third force, which at any instant maintains the other two in equilibrio.



INCLINED PLANE.

To find this pressure in any given direction, it is only necessary to find the components of the other two forces, which act in directions parallel to the given direction, and the equilibrium is established by the general theorem of parallel forces—viz., the resultant of two parallel forces is always equal to their sum if they act in the same direction, and to their difference if they act in contrary directions. This resultant in the case of the lever is the pressure upon the fulcrum, acting in the direction of the greater force if the parallel components of the forces act in opposite directions, and in the common direction of the forces if they act in the same direction. All problems of levers, whether they be straight or bent, and whether the forces applied to them are parallel or oblique, may be solved by the application of the preceding rules.

The wheel-and-axle and the movable pulley are elementary machines, depending for their action on the principle of the *lever*, although sometimes classed as separate mechanical powers. The fixed pulley merely changes the direction and point of application of the force applied to the cord passing over it, but no other advantage results from it. In the case of the movable pulley the fulcrum is movable, and acts as an instantaneous axis, the resistance acting between the power and the ful-

crum. The *inclined plane* and the *jointed links* depend for their action on the theorem of the parallelogram of forces. Representing the relations between the height, length, and base of an inclined plane by the altitude, hypotenuse, and base of a right-angled triangle, the relation between the forces which cause a sliding of a body on an inclined plane is as follows: If the effort or power be applied parallel to the length of the plane, and the resistance parallel to the height, the effort will be to the resistance as the height of the plane to the length. When a man rolls a barrel up an inclined plane into his wagon, he obtains not only the advantage of the inclined plane, but also the advantage of rolling over sliding friction. The total useful work performed, leaving friction out of consideration, is the work of elevating the weight of the barrel from the ground to the wagon; and this total work can in no way be avoided. It is, however, accomplished by a small muscular effort exerted through a greater space than the height of the wagon, the diminution of the effort necessary depending on the length of the plane.

The wedge is an example of an inclined plane. When a pressure is exerted against the end of a wedge to force it forward, the resistance against the face of the wedge will be to the pressure applied to the end as the distance through which the wedge moves is to the distance, perpendicular to the face, through which the material yields to the action. The screw is an inclined plane in the form of a helix wound around a cylinder, and its action is determined by the same laws. The jointed links, in which the relation between the power and resistance is found by the application of the parallelogram of forces, is not so often found in artificial constructions as some of the other elementary machines, but it possesses especial interest in being found applied in the mechanism of all walking or leaping animals. A few artificial constructions, among which may be named



SIMPLE HYDROSTATIC PRESS.

If one bar rest against an immovable point of resistance, and the other be guided in a given direction, when the two bars approach a straight line the action of the force at the joint is to overcome a much greater resistance at the end of the guided bar. A succession of jointed links, as in the hinder legs of leaping animals, not only multiplies motion, but enables the animal to exert the greatest effort in the direction of the terminal motion.

The *hydrostatic press* is an elementary machine which depends for its action on the principle of distribution of pressures through the medium of a liquid. If a closed vessel filled with a liquid be tapped at any point, and a small piston be inserted in such a manner that an external pressure may be applied to the piston, no liquid being allowed to escape—when such a pressure is applied, every part of the internal surface of the vessel, equal in area to the piston, will feel the additional pressure independently of all the other parts. If one end of the vessel be closed by a tight piston movable outward, the total additional pressure upon the surface of this larger piston will be equivalent to the sum of all the additional pressures upon its part, each of these small parts being equal to the area of the smaller piston. The force required to resist the total additional pressure on the large piston will then be as many times greater than the force applied to the small piston as the surface of the larger is greater than the surface of the smaller piston. If motion take place, the extent of motion of the two pistons must follow the inverse of this rule. The distance passed over by the two pistons will be inversely proportional to their areas. See HYDROSTATIC PRESS; MECHANICS.

Mechanics, that branch of natural philosophy which treats of the action of forces on bodies. It is divided into statics, which treats of the action of forces in equilibrium, and dynamics, which treats of the action of forces on bodies in motion. Newton divided it into practical and rational mechanics, the former relating to the mechanical powers and the latter to the theory of motion. In a restricted sense the word mechanics signifies the inventing of machines, or at most consideration of the action of forces on them, and this is the sense in which the ancients used it; but the science has long since passed beyond such limits, and comprehends the laws by which the motions of the heavenly bodies are governed, as well as those which affect their form, and also the action of gravitation on bodies on the earth. Hydrostatics, hydrodynamics, and pneumatics, are considered branches of the general science of mechanics.

The proficiency of the ancients in practical mechanics is sufficiently evinced by the descriptions of machines which have been preserved in their writings. In the construction of temples, pyramids, bridges, aqueducts, and other great works, the elementary machines must have performed an important part; indeed, some ideas of modern physics seem to have entered into the conceptions of the old Greek philosophers, such as that of the elements or atoms, the ether, and the idea that all things are in incessant motion. Archimedes, 287–21 B.C. may be said to have laid the foundation of theoretical mechanics in his investigations in regard to the lever, centers of gravity, etc. The theory of Aristotle, that a body contains in itself the principles of rest and motion, uninfluenced by external causes, continued, however, to be received until the time of Galileo, 1564–1642. Galileo disputed the ideas of Aristotle, and by experiments on

falling bodies showed the existence of a force independent of the falling body which produced a velocity of motion dependent on the time of descent, and not on the mass of the body. After this the science made slow but gradual progress, and was extended in its signification beyond the principles of mere mechanical contrivances to embrace the laws of force and motion as exhibited in universal phenomena. See **DYNAMICS**; **MECHANICAL POWERS**; **PHYSICS**.

Mechanicsville, village of Virginia, abt. 7 m. NE. of Richmond, which gives its name to a battle fought near by between the Confederate and Federal forces, June 26, 1862, also known as the battle of Beaver Dam Creek. The loss of the Confederates between 3,000 and 4,000; Federal loss less than 400.

Mechlin (mêk'lin), city of Belgium; province of Antwerp, on the Dyle; 14 m. SSE. of Antwerp; is the see of the archbishop primate of Belgium, and has an ecclesiastical seminary and several other educational institutions. Its cathedral is a magnificent edifice, erected in the twelfth century. Mechlin has manufactures of linen, woollens, needles, lace, and beer. Pop. (1907) 59,107.

Mecklenburg, Declaration of Independence, series of resolutions published in *The Register* at Raleigh, N. C., April 30, 1819, purporting to have been adopted by the citizens of Mecklenburg in that state, May 20, 1775. The resolutions contained several phrases almost or quite identical with portions of the famous Declaration of July 4, 1776. John Adams, who first learned of the resolutions 1819, declared in a letter to Jefferson that if he had known of them in 1776 he would have made the halls of Congress ring with them, and that they would have been published in every Whig newspaper in the colonies; and Jefferson in reply expressed his surprise that Adams should not have seen at a glance that the publication was fraudulent. From that day to this the question as to whether the resolutions were actually passed by the citizens of Mecklenburg has been in dispute.

Mecklenburg-Schwerin (-shwä-rën'), grand duchy of Germany; bounded N. by the Baltic, and E., S., and W. by Prussia; area, 5,068 sq. m.; pop. (1905) 625,045; capital, Schwerin. Along the shore of the Baltic the soil is sandy or marshy, but farther inland it is fertile and well suited to agriculture and pasturage. The principal crops are rye, wheat, barley, oats, potatoes, and hay. Cattle and horses are reared, and, especially the latter, are much valued.

Mecklenburg-Strelitz (strä'lits), grand duchy of Germany, consisting of two separate parts—Stargard, between Mecklenburg-Schwerin and Pomerania, and Ratzeburg, between Mecklenburg-Schwerin and Lauenburg; area, 1,131 sq. m.; pop. (1905) 103,451; capital, Neu-Strelitz.

Med'als. See **NUMISMATICS**.

Medal'ion, originally a large medal; a flat, circular work of art of any sort; or any piece of ornament consisting of an independent de-

sign isolated by its own frame. In the first sense the term is applied to unusually large coins, especially to the remarkable bronze pieces of the Roman emperors, those without the S. C. (for *Senatus Consultum*), and thus shown to be not a part of the regular bronze coinage. In the second sense the bas-reliefs in question may be considered as imitations of medals, as if medals had been copied larger for general popular inspection. In the third sense a medallion may be of any shape, square or oblong, or even irregular. Thus, on a Sevres vase, a painting with figures and an elaborate landscape background will often be inclosed within a frame of the general shape of a trapezoid, the rest of the vase being decorated with simple gilding and scrollwork; but this painting is spoken of as a medallion, or as being in a medallion. In carpets which are woven in one piece, and rugs, tablecloths, etc., there is very often a central pattern, between which and the border there is left a space somewhat less richly ornamented; this central division is spoken of as the medallion, and a carpet of this kind is often called a medallion carpet.

Mede'a, in Greek mythology, daughter of Æetes, King of Colchis, famous for her skill in sorcery. She enabled Jason to possess himself of the golden fleece (see **ARGONAUTS**), and accompanied him to Greece, but was subsequently deserted by him for Crete'sa. In revenge Medea destroyed her own children by Jason, and sent to Crete'sa a poisoned garment which burned her to death. Then, fleeing to Athens, she married Ægeus, by whom she had several sons. Being detected in laying snares for the destruction of Theseus, she was driven from Attica, and went to Asia with her son Medus, who became the founder of the Median nation. She is the subject of ancient and modern tragedies.

Medellin (mä-thêl-yën'), capital of department of Antioquia, Colombia, and, with the exception of Bogotá, the largest and most important city of the republic; 147 m. NW. of Bogotá, and 4,852 ft. above the sea. The city is an educational center, containing a university, a school of arts and technology, library, museum, theological seminary, several charitable institutions, a park, etc.; it is the episcopal city of a large diocese, has a mint and other Government institutions, and is the metropolis of the Antioquia gold belt. Pop. (1908) 60,000.

Med'ford, city in Middlesex Co., Mass.; on the Mystic River; 5 m. N. by W. of Boston; founded 1630; the seat of Tufts College (Universalist), and contains a house erected 1634, which still retains its original walls and shape. The city is noted for its manufactures of rum, crackers, and felt boots, and has print and dye works, pressed and face brick works, brass foundry, carriage factories, and paper mills. Pop. (1910) 23,150.

Me'dia, ancient country of Asia; bordering N. on the Caspian Sea, and bounded on the other sides by Parthia and Hyrcania, Assyria

and Armenia, and Persia and Susiana; corresponded nearly to the present Persian provinces Irak-Adjem, Azerbaidjan, Ghilan, and Mazandaran. The Medes were closely allied to the Persians in language and religion, and they distinguished themselves by their horsemanship and their skill with the bow. The original inhabitants of Media were called Aryans, though the name *Madai* is given them even in Genesis x, 2. They came first into notice when attacked by the Assyrians abt. 830 B.C. The great monarchy established by them dates from 650 B.C., with Ecbatana for its capital. In 625 B.C. their king, Cyaxares, in league with Nabopolassar of Babylon, took Nineveh and overthrew the Assyrian Empire. The revolt of the Persians under Cyrus brought the Median Kingdom to an end, 558 B.C. The Medes, who originally were a warlike race, are later spoken of as a very effeminate people.

Med'ical Electric'ity, or **Electro-therapeutics**, therapeutical application of electricity. Scribonius Largus, a physician of the time of the Emperor Tiberius, employed electric fishes for the cure of gout, and Pliny and Dioscorides speak of electricity as a therapeutical agent in several diseases. It was not till about the middle of the eighteenth century, or a century and a half after the observations of Dr. Gilbert, of Colchester in England, that much was done in the way of applying frictional electricity in electro-therapeutics. The agent was employed in every form then attainable—in baths, in electric jets and streams, and in shocks. The discoveries of Galvani and Volta gave a new electric force, and the controversy between their followers revived the interest of the medical profession and physicians generally in electro-therapeutics. Owing to the frequent failures of electricity to realize the hopes of its friends, the great body of scientific physicians was slow to recognize it as a trustworthy therapeutical agent, and it fell into the hands of charlatans. Faraday's discovery of inductive electricity, 1831, began a new era in medical electricity. The construction of magneto-electric machines by Saxton, Keil, Ettinghausen, and Stöhrer offered facilities for the use of electricity in medicine not before known. Three forms of electricity are employed, *viz.*, the induced or faradic current, the galvanic current, and the static current. The two first are examples of dynamical electricity, and the other of frictional electricity. Galvanic electricity, or galvanism, and induced electricity, or faradism, as it has been called out of compliment to its discoverer, Faraday, are the two modes generally made use of, while frictional electricity is rarely resorted to.

Medical Jurispru'dence. See JURISPRUDENCE, MEDICAL.

Medici (méd'è-ché), Cosimo de', 1389-1461; Florentine banker, statesman, and patron of letters; son of Giovanni, *gonfaloniere*; inherited a large fortune; by his liberality, urbanity, and prudence won great influence with the people; adorned Florence with splendid public buildings and fostered art and literature; was called "Pater Patriæ."

Medici, Cosimo de', 1519-74; first Grand Duke of Tuscany; was a successor of Alessandro (1510-37), the subverter of Florentine liberty; was declared grand duke by Pius V, 1569.

Medici, Lorenzo de' (called "THE MAGNIFICENT"), 1448-92; Florentine statesman; grandson of Cosimo (1389-1461); was a grand patron of Greek learning and of all the liberal arts, being himself no mean poet. He brought Florence to a great pitch of opulence and power, and notwithstanding the hostility of Pope Sixtus IV, exercised a great influence throughout Europe. His son, Pope Leo X, did much to advance the fortunes of his family.

Med'icine, art and science of curing disease. Medicine is distinguished from surgery in that the latter treats disease or injury by operative interference. Medical science is now divided into many special departments, but its general divisions are: *Hygiene*, the science of health, with such subdivisions as dietation, the science of foods. *Pathology* is the science of disease and is divided into microscope pathology, which treats of the actual changes and degeneration the cells of the body undergo in disease, and pathological anatomy, which considers the gross results of such microscopical changes. *Nosology* treats of the various diseases, and *diagnosis* covers the methods of determining what diseases are present. *Therapeutics* and *materia medica* deal respectively with the general methods used for the care of diseases and with the drugs generally recognized in medical practice.

Medicine in its primitive state comprised a recognition of the relative virtues of different foods, an empirical use of medicinal herbs and roots, and superstitious rites. For ages it was merely traditional usage in families or communities. Hence it was practiced, as it is to-day in barbarous tribes, by the local chiefs. Superstition ascribed disease to evil spirits or to the displeasure of divinities, revered the gifted physicians as superhuman, and erected temples to their worship. The profession thus became a priestly order, within which acquired knowledge of medicine was preserved and secretly transmitted. The Chinese have practiced and written of medicine from the remotest ages, but without intelligence or method. The Hindu practice has always been simple, restricted to a knowledge of dietetics, hygiene, and mild measures to prevent inflammation. In Egypt the method first pursued was to expose the sick by the wayside, that passersby who had suffered from similar maladies might recognize them and declare the means of cure. The Babylonians, Chaldeans, and other nations had no physicians, but followed this custom. Afterwards, in Egypt, the sick were required, upon recovery, to go to the temple and record on tablets their symptoms and remedies. The temples of Canopus and Vulcan were the repositories, and a skilled priesthood arose which framed a code controlling public hygiene, individual regimen, and the treatment of disease.

The reports concerning the practice of medicine in Greece in early times are legendary.

Æsculapius became the god of medicine, temples were erected bearing his name, and the officiating priesthood were designated as the *Asclepiadæ*. *Hygieia*, the goddess of health, and *Hercules*, reputed to cure epilepsy—the “sacred disease” or “disease of *Hercules*”—were also worshiped. The practice of the *Asclepiadæ* was simple. Temples were located in salubrious places, and their interiors were purified by burning fragrant incense and secret remedies. Recourse was had to baths, gymnastics, mineral and thermal springs, and the use of unctions. Remedies were prescribed by the oracle and skill of the priesthood. *Pythagoras* and the sect which took his name supplanted the *Asclepiadæ*. They promulgated the knowledge which had before been kept a secret, and sought the philosophy of disease, but confined their treatment to dietetics and hygiene. The *Pythagoreans* declined abt. 500 B.C. *Hippocrates*, born 460 B.C. and known as the “father of physic,” developed a system of theories on disease and medicine which has given to his school and period of practice the title “dogmatic.” He acquired anatomy by dissection of animals, was skilled in surgery, and recognized stages and crises in diseases; he relied on the power of nature, which he termed “first of physicians”; stimulating when nature failed, moderating when her forces were excited. His remedies were mainly vegetable and dietetic.

With the founding of the Alexandrian Library, 320 B.C., the Alexandrian school began. Most celebrated were *Erasistratus* and *Herophilus*. Two Alexandrian schools of medicine flourished successively—the “Empirical” of *Philenus* and *Serapion*, who renounced “dogmatism” and relied only on experience, and the “Methodists,” whose influence extended over Greece, thence to Rome, and lasted for at least two Christian centuries. Methodism asserted that the body was permeated in health by atoms which entered from without and moved freely in every part and direction of the organism. Disturbances of this perfect relation by constriction or relaxation were states of disease, and all medication was therefore by astringents or relaxants. Medicine was introduced into Rome from Greece, 200 B.C. *Asclepiades*, who practiced in Rome 100 B.C., was a Methodist. Chief among Roman physicians was *Celsus*, “the Cicero of medicine,” great as a surgeon and scholar. *Claudius Galen* (b. 130), by his teachings and writings, so influenced medicine that he was esteemed infallible authority for fully thirty centuries. His knowledge of anatomy was matured by dissection of animals. He was a “Humoralist,” regarding disease as due to putridity of the “four humors”—blood, phlegm, bile, and black bile. The Methodists, on the other hand, found disease only in the tissues, and were known as “Solidists.”

During the Dark Ages medicine declined in Europe, but was preserved and advanced by the Arabian school, which dominated from the ninth to the end of the fourteenth century. Symptoms were studied, new diseases described, *Galen's* works were translated and commented, rendering famous the names of *Rhazes*,

Avicenna, *Albucasis*, *Avenzoar*, *Averroës*, etc. The Italian schools succeeded the Arabian. To *Andreas Vesalius*, professor at Padua, who published his great work, 1543, anatomy owes its origin and permanent impetus. *Vesalius* was followed by *Eustachius*, *Fallopian*, *Sylvius*, *Pacchioni*, and others whose names now exist in anatomical nomenclature. In 1622 A.D. *Aselli* described the lacteals; 1628, *Harvey* announced the circulation of the blood; 1661, *Malpighi* detected the movements of the red blood globules; 1690, *Leeuwenhoek* demonstrated the capillaries.

The researches of *Viussens*, *Haller*, *Meckel*, and *Scarpa*, the separation of the cerebrospinal and ganglionic nervous systems by *Bichat*, the treatise of *Sénac*, 1749, on the action and diseases of the heart, of *Avenbrugger*, 1761, on percussion of the chest, the great work on pathology by *Morgagni*, 1762, the recognition of nerve origins, of the ganglia, and different faculties in the brain by *Willis* and others, the writings of *Sydenham* and *Huxham*, the discovery of vaccination by *Jenner*, 1796, are a few of the very many scientific truths which warrant us in speaking of medicine as a science. Clinical teaching was inaugurated at Padua, 1758. During the nineteenth century this devotion to the development of technical and scientific investigation, rather than to speculation, as the true basis of the treatment of disease, steadily increased. The physical exploration of the chest, the study of *Bright's* disease, the discovery of anæsthesia, the recognition of the dependence of many if not most diseases—erysipelas, tuberculosis, tetanus, and many others—on the presence of microorganisms, the improved treatment of wounds by aseptic and antiseptic methods, the discovery of the various antitoxins, and the elaboration of the specialties, are some of the many results. See ALLOPATHY; HOMEOPATHY; PSYCHOTHERAPY; SURGERY.

Medi'na (Arab. MEDINET-EL-NABI, “City of the Prophet”), city in Hedjaz, Arabia; 132 m. N.E. of Jemb or Yambu, its port; is a handsome, well-built town, at the edge of the great Arabian desert on the E. side of the mountain range which runs N. and S., parallel to the Red Sea. It is protected by a stone wall over 40 ft. high, with thirty towers and three gates, one of which, the Egyptian Gate (*Bab-el-Misri*), is exceedingly beautiful. Its importance is derived from the fact that *Mohammed* is buried here. His tomb, close outside the great mosque *El Haram*, is visited annually by over 60,000 pilgrims, though the visit is considered not incumbent, but only meritorious. Near by are the tombs of his daughter *Fatima* and of the Caliphs *Aboubekr* and *Omar*. The mosque—according to *Burckhardt*, 165 paces long and 130 wide, its dome upheld by 400 columns, lighted by 300 lamps which burn night and day—was burned, 1508, and rebuilt, 1514, by *Kaid Bey*, Sultan of Egypt. Mussulmans do not agree as to whether Mecca or Medina has the greater sanctity. Medina has ninety-two names, all referring to the holy character of *Mohammed*. Pop. (1900) 48,000.

Medinet Habu (mé-dé'nét há-bó'), Christian village at W. Thebes, Upper Egypt, dating from the fifth century, which gave its name to a mass of ruins representing two temples. The larger one dates from the twentieth dynasty, and was intended as a memnonium of Rameses III, being devoted to the preservation of his memory and renown. Its mural decorations are of great ethnological value on account of the care taken to reproduce the racial characteristics of the peoples against whom Rameses III waged war. Other inscriptions are important to the history of the times. The smaller temple dated originally from the eighteenth dynasty, but it was extended by the Ptolemies and even by the Roman emperors, especially Antoninus.

Mediterranean Sea, large sea bounded by the continents of Europe, Asia, and Africa, 2,200 m. long, 700 m. broad to the E. of Sicily, and covering an area of 977,000 sq. m., excluding 40,000 m. of island surface. It has a very irregular shape, forming many gulfs, as those of Lyons, Genoa, Taranto, Lepanto, Koron, Kolokythia, and Salonica on the shores of Europe; on the shores of Asia, Adramyti, Smyrna, Adalia, and Iskanderun; on the shores of Africa, Sidra and Cabes; and bearing different names in the different localities—as, for instance, the Tuscan, Ionian, Adriatic, and Aegean seas. It is in general a deep sea, the average being 4,393 ft. The greatest depths are W. of Sardinia (12,238 ft.), between Crete and Egypt (10,974 ft.), and between Sicily, Greece, and Barca (13,018 ft. at lat. 35° 5' N. and lon. 18° 8' E.). It is nearly cut in two by a shallow region between Sicily and Tunis. It communicates E. with the Black Sea through the Strait of Constantinople, and W. with the Atlantic through the Strait of Gibraltar. A much greater evaporation takes place in the Mediterranean than in the Atlantic or in the Black Sea, owing to the hot winds which blow over it from N. Africa, while the Pyrenees and the Alps prevent the cold winds from N. Europe from reaching it. There is very little tide, owing to the narrowness of the strait which connects it with the ocean.

Medlar, fruit-bearing tree of the rose family, common in the wild state in most parts of



MEDLAR.

Europe, some of the finer varieties of which are cultivated. It is a large shrub or small

tree, usually with very crooked branches, simple leaves, and flowers resembling those of the pear; the fruit in the cultivated kinds is about 1½ in. in diameter and broader than long. The plant has been used for hedges, and it is sometimes set as an ornamental tree.

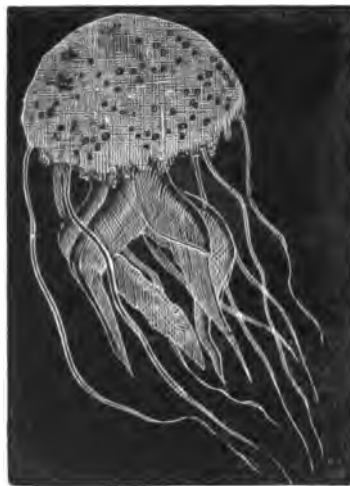
Medley, John, 1804–92; Canadian prelate; b. England; was several years vicar of St. Thomas's, Exeter, prebendary of the cathedral, and, 1845, was consecrated first Anglican bishop of the See of Fredericton, comprehending the province of New Brunswick, Canada. Here he built a cathedral of great architectural beauty at his own cost, where the services of the cathedrals of the motherland were maintained. After the resignation of Dr. Oxenden, Bishop of Montreal and metropolitan, Bishop Medley was chosen to be metropolitan, and held the primacy of the Canadian Church until his death.

Médoc (mä-dök'), name of a district of France stretching along the Gironde, from Ambès to Lesparre; is about 40 m. long and from 5 to 12 m. broad; is wholly covered with vineyards, which produce the most famous kinds of Bordeaux wine.

Medul'la Oblonga'ta. See BRAIN.

Medu'sa. See GORGONS.

Medusa, name given to any one of the free-swimming Cœlenterates, commonly called jellyfish. These all have a disklike or umbrella-shaped body, the proboscis, at the end of which is the mouth, corresponding to the handle, while the radiating divisions of the digestive cavity correspond to the ribs which support



JELLYFISH.

the cloth. They swim by means of contractions of the umbrella, and they kill their prey by means of the many poisonous cells (nettle cells) which cover certain portions of the body. Around the margin of the umbrella occur sense organs (eyes and ears), while below these depends a fringe of tentacles like the fringe on a parasol. Two great groups of medusæ are recognized, which, though so similar in exter-

nal appearance, are widely different in structure: *hydrozoa* and *aoraspedia*, the former containing the only fresh-water medusæ known.

Meerschaum (mër'shām), German "sea-foam," compact mineral with a smooth surface; soft when first dug out of the earth, but hardening to 2.0 and 2.5. In composition it approaches silica, 60.9 per cent; magnesia, 26.1 per cent; water, 12 per cent. It is obtained from localities in Turkey, Asia Minor, Morocco, etc., where it is used as a substitute for fuller's earth; its principal use, however, is for the bowls of tobacco pipes.

Mee'rut, or **Mi'rat**, name of a division, district, and city in the United Provinces of Agra and Oudh, British India. The city is near the right bank of the Kali-Nadi, an affluent of the Ganges, and 38 m. NE. of Delhi; is an ancient place; has numerous ruins testifying to its former splendor; and is now best known as the place where the great Indian or Sepoy mutiny broke out. Pop. (1901) 118,129.

Megalon'yx, generic name of extinct Quaternary mammals from N. and S. America, allied to the sloths. The type, *Megalonyx*, was first discovered in the caves of Virginia, and named by Pres. Jefferson in allusion to its large claws, the length of the terminal phalanx or bony support of the median claw being 7 in., or more than one third the length of the humerus of the same animal. Its remains have also been found at Bigbone Lick in Kentucky, and other localities. The typical species has received the name *M. jeffersoni*.

Megalop'olis, city of Greece; on both sides of the Helisson, an affluent of the Alpheus. It was founded by Epaminondas, 370 B.C., immediately after the battle of Leuctra, for the purpose of gathering the Arcadian communities, hitherto independent of each other, into a compact state, thereby forming a bulwark against Sparta. The city had abt. 70,000 inhabitants, but it never acquired any considerable importance. It contained the greatest theater in Greece, of which remains are extant.



MEGALOSAURUS (restored).

Megalosaurus (mäg-ä-lö-sä'rūs), large carnivorous reptile from the Oolite and Wealden

of England, belonging to the order *Dinosauria*, and exemplifying the carnivorous type of that order, as *Iguanodon* does the herbivorous. *Megalosaurus bucklandi*, the best known species, was perhaps 30 ft. in length, and attained a weight of 2 or 3 tons. Remains of *Megalosaurus* have been found in the strata of the Mesozoic or Reptilian age in England, from the Lias to the Wealden; also in the Kimmeridge clay at Honfleur in Normandy, and in Oolite at Besançon, France.

Meg'aphone. See **SPEAKING TRUMPET**.

Meg'ara, city of ancient Greece and capital of Megaris, a territory bounded by Attica, Boeotia, Corinthia, the Saronic and the Corinthian gulfs. As early as the seventh and eighth centuries B.C. it was a prosperous and even wealthy city. It formed many colonies, of which Chalcedon and Byzantium were the most remarkable. It entered into rivalry with Athens, but became subject to that city. By its attempts to free itself from the Athenian supremacy it became one of the causes of the Peloponnesian War. Pop. abt. 6,500.

Megas'thenes, Greek statesman and author in the service of Seleucus Nicator, who became monarch of Syria, Persia, and Bactria. He was sent as ambassador abt. 302 B.C. to the court of Sandracottos (Chandragupta), King of the Prasii, at Palibothra (Pataliputra) on the Ganges, supposed to be the modern Patna. He resided at this capital many years, and wrote a work on the history and geography of India, which was the foundation of nearly all that subsequent writers have communicated on ancient India.

Megathe'rium, genus of extinct Quaternary mammals. Their remains are more abundant in S. than in N. America, and indicate a former much greater development of the order of



MEGATHERIUM (restored)

Edentates than now prevails. The vertebrae of the tail are very large and powerful, and that organ, with the hind legs, seems to have formed a support for the heavy body, while the huge fore legs were employed in breaking the branches from trees or tearing them down for food. *Megatherium ouvieri*, from S. America, ex-

ceeded the rhinoceros in size, its skeleton measuring 18 ft. in length. *M. mirabile* is a N.



MEGATHERIUM (skeleton).

American species, and its remains occur in Georgia and S. Carolina.

Me'grim. See MIGRAINE.

Me'hemet A'li Pasha', 1769-1849; first Viceroy of Egypt; b. Kavala, European Turkey; son of Ibrahim Agha, an Albanian officer in the Ottoman service; headed the contingent sent to assist in expelling the French from Egypt, and, 1799, was appointed colonel; obtaining ascendancy over the other Albanians in the army, pursued a course of intrigue and duplicity, and in a revolt of the Albanians was proclaimed viceroy of Egypt, in which office he was confirmed by the sultan, 1805. He crushed the Mamelukes, the scourge of Egypt, by a series of massacres, and the Wahabees, who had seized Mecca, by an organized army; sent a fleet under his son Ibrahim Pasha to aid the sultan in putting down the Greek revolution; confiscated private property, gained vast revenues from traffic in slaves, and became practically proprietor of Egypt. A quarrel with Abdallah Pasha of Acre caused him to send an army under his son into Syria, and on refusing to withdraw it he was declared an outlaw by the sultan. Ottoman armies sent to enforce the sultan's will were defeated, and Great Britain and France, fearing Russian intervention, persuaded the sultan to yield to Mehemet Ali's demand that he be made governor of the joint Syrian pashalics. Troubles arose anew, 1839, and the Ottoman army was destroyed at Nezib. Austria, Great Britain, Prussia, Russia, and the sultan signed a treaty ordering the viceroy to evacuate Arabia and Syria, but, encouraged by France, he refused to submit. Finally, deserted by that power, he was compelled by Admiral Napier to accept conditions which left him nothing but the viceroyalty. Ibrahim Pasha succeeded him.

Méhul (mā-ül'), **Étienne Henri,** 1763-1817; French composer; b. Givet, department of the Ardennes; went, 1779, to Paris with an introduction to Gluck, under whom he studied;

made a successful début as a composer, 1791, by his opera, "Euphrosine and Conradin"; achieved a most brilliant success by his composition of Chenier's song, "Chant du Départ"; became professor at the Conservatory; wrote forty-two operas; most remarkable composition, besides the above-mentioned song, is his opera of "Joseph."

Meilhac (mā-lāk'), **Henri,** 1831-97; French dramatist; b. Paris; employed as a humorous illustrator and writer for the periodical press, 1852-55; began his career as a dramatist, 1855; elected to the Academy, 1888; wrote many of the operettas of which Offenbach composed the music, including "La Belle Hélène," "La Vie Parisienne," "La Grande Duchesse," "La Périochole," and "Les Brigands." Nearly all of his work was done in collaboration, mainly with Ludovic Halévy. Some of his most successful unaided productions were "Ma Cousine," "Décoré," and "Petite Marquise."

Meissner (mīs'nér), **Alfred,** 1822-85; German author; b. Teplitz, Bohemia; lived in Paris, Prague, and Bregenz at Lake Constance; published "Liska," an epic poem; dramas, including "John of Suabia," sketches, and literary and lyric poems of great beauty. He entered into partnership with a man named Hederich, and was forced not only to publish novels by him under his own name, but also to meet under threat of exposure Hederich's exorbitant pecuniary demands.

Meissonier (mā-sō-nē-ā'), **Jean Louis Ernest,** 1815-91; French genre and military painter; b. Lyons; pupil for a short time of Léon Cogniet, but obtained his art education in the main by the study of the old masters, especially those of the Dutch school. The first picture he exhibited was "The Visitor," 1834. He received a first-class medal, 1843, and, 1848; 1848, the decoration of the Legion of Honor; was made a grand officer, 1878; at the Paris expositions of 1855, 1867, and 1878 was awarded medals of honor; was elected, 1861, a member of the institute. His works are remarkable for their wonderful truth and exactness in detail, while they are painted with breadth and completeness of general effect. His pictures have been sold for enormous prices, and most of them are in private collections in Europe and the U. S. "Napoleon III at Solferino" is in the Luxembourg Gallery, Paris; "La Rixe," in Buckingham Palace, London; "Friedland—1807," in the Metropolitan Museum, New York.

Meis'tersinger. See MASTERSINGERS.

Mejia (mā-hē'ā), **Tomás,** abt. 1812-67; Mexican military officer; b. Guanajuato; was of pure Indian blood, and uneducated; rose from the ranks; fought against Taylor in the war with the U. S., 1846-47; subsequently supported the Conservative or Church Party, and was conspicuous on its side in the civil wars, 1857-61. In 1862 he joined the French and subsequently was one of the most trusted generals of Maximilian, to whom he was much attached. He was captured at the fall of Querétaro, and executed there with Maximilian.

Mekhitar, or **Mechitar** (mêkh's-târ), **Peter**, 1676-1749; Armenian religionist; b. Sebaste, Lower Armenia; on entering a monastery, 1690, discarded his true name Manuk for Mekhitar, "comforter"; founded in Constantinople, 1701, a congregation for the purpose of uniting the Armenian and Roman Catholic churches; on account of persecution removed, 1703, to Modon, in the Morea, and founded a monastery; expelled by the war between Turkey and Venice, he repaired to the latter city, and having received the island of San Lazzaro, built a new monastery. The Mekhitarists have branches in Italy, Germany, and Turkey, but united Armenians are scarcely found in Armenia proper.

Mek'ka, or **Mec'ca**, chief city in the vilayet of Hedjaz, Arabia; 48 m. E. of Jeddah, its port on the Red Sea; is in a narrow and barren valley inclosed by naked hills; and though it has neither trees, squares, public buildings, nor paved streets, and is dusty and muddy by turns, is handsomer and better built than most E. cities. As birthplace of Mohammed it is the most celebrated city of Islam. It also contains the Kaaba, around which has been built the immense mosque El Haram, begun by the Caliph Omar, 634-644, added to by various caliphs, sheriffs, and sultans, so that now the original form is lost in an agglomeration of buildings. El Haram has seven minarets, more than any other mosque in the world, and nineteen gates. The city has no manufactures or trade properly speaking, the main support of the inhabitants being derived from letting rooms to the pilgrims and supplying their necessities. Pop. abt. 60,000.

Meklong', river and town of Siam; river rises in the mountains between Tenasserim and Siam, is 250 m. long, navigable for the lower 30 m. from Pra-Pri, is connected by a canal with the Menam near its mouth, and empties into the NW. angle of the Gulf of Siam. The town, an important port, is on the river, 5 m. above its mouth.

Mekong', or **Cambo'dia**, chief river of the Indo Chinese peninsula; rises in the Kuenlun Mountains, Tibet, flows SE. through the Chinese province of Yunnan, the E. part of Burma, Laos, Siam, Cambodia, and French Cochinchina, and empties through several channels into the China Sea near Cape St. Jacques; length, main stream, about 1,800 m. In the early part of its course, in Tibet and China, it is called the **Lan-tan**; the Burmese call it **Kin-lun**; while the name **Mekong** is locally applied to that longest portion lying in Siamese and Cambodian territory. For some distance from its mouth the river is navigable even for large vessels.

Mekran', or **Makran**, name of the coast regions of SW. Baluchistan and SE. Persia; is an arid and desolate region, traversed by chains of bare, rocky, or sandy hills running parallel to the coast, without permanent rivers. It is about equally divided between Baluchistan and Persia, and inhabited by many mutually independent and jealous tribes.

Melam'pus, in Greek mythology, son of Amythaon and Idomene, and brother of Bias. In front of his house in the country stood an oak tree in which a snake had built its nest. Servants killed the mother snake, whose body Melampus reverently burned. The young snakes he reared as pets. In return therefor, as Melampus slept, the young snakes licked out and purified his ears, so that on waking he found that he understood the language of the birds, who thereafter instructed him in the prophetic art. He became the most distinguished of soothsayers.

Melanchthon (mè-lànch'tôn), **Philip**, 1497-1560; German reformer and theologian; b. Bretten, Baden; became Prof. of Greek at Wittenburg, 1518, where he was convert, friend, and colleague of Luther, then Prof. of Divinity. In 1519 he attended the Leipzig disputation, and defended Luther with his pen against Dr. Eck, the champion of the Church of Rome. In 1521 he published the "Loci Communes," the first system of evangelical Protestant theology; 1529, accompanied his prince to the Diet of Spire, and helped to draw up the famous protest, which gave rise to the name of Protestants; in the same year attended the unsuccessful theological conference with the Zwinglians at Marburg; 1530, spent several months at Augsburg during the session of the Diet, and wrote his most important official work, the "Augsburg Confession." Soon afterwards he replied to the "Refutation" of the Catholic divines by the "Apology of the Confession." Subsequently he made considerable modifications and alterations in the Confession, with a view to adapt it to the Reformed Churches; 1536, endeavored, with Bucer, to bring about a doctrinal compromise between the Lutheran and Zwinglian views on the Lord's supper; 1537, signed the "Articles of Smalcald." In all the conferences with the Roman Catholics, at Worms, 1540, and Ratisbon, 1541, he was the delegate of the Lutheran Party. In these conferences his love of peace, and hope of an ultimate reconciliation of Catholicism and Protestantism, led him to make many concessions, and to agree to compromises which satisfied neither party and were soon broken up. In 1557 he attended the last theological conference with the Roman Catholics at Worms. From Luther's decease, 1546, to his own death Melanchthon was the acknowledged leader of the German Reformation.

Melanes'ia, one of three great ethnographic divisions of Oceania, being the part occupied by peoples with a black skin, while the natives of Micronesia and Polynesia are lighter in color. The Melanesian archipelagoes are, in order from the NW. to the SE., Bismarck Archipelago, the Solomon Islands, the Santa Cruz Islands, the Tucopia group, the New Hebrides, New Caledonia and the Loyalty Islands, the Chesterfield Islands, and finally the Fiji Islands, where the population is so mixed with Polynesian that it may be indifferently attributed to Melanesia or Polynesia. The total area of these islands is 56,300 sq. m. The Melanesians are closely allied to the Negritos, though there are great differences in language.

They differ physically from the Polynesians, though there are striking resemblances in customs and languages.

Mel'bourne, William Lamb (Viscount), 1779–1848; English statesman; b. at Melbourne House, Derbyshire; was educated at Eton and Cambridge; studied politics and jurisprudence at Glasgow; was called to the bar at Lincoln's Inn, November 23, 1804; entered Parliament, 1805. He attached himself to the Whig Party; became Chief Secretary for Ireland, April, 1827; succeeded to the title on the death of his father, July 22, 1828; was a distinguished advocate of Catholic emancipation and of parliamentary reform; became Secretary of State for the Home Department in Earl Grey's Cabinet, November, 1830, and on the retirement of the latter, July 9, 1834, succeeded him as First Lord of the Treasury and Premier; was dismissed in November of that year, but recovered his place in April, 1835, through the support of the House of Commons, and retained his position until August 30, 1841. He was therefore the responsible head of the British Govt. at the accession of Queen Victoria and during the first four years of her reign, and contributed much to the education of his young sovereign in her royal duties. Died at Melbourne House, Derbyshire.

Melbourne, capital of the State of Victoria, Australia; on the Yarra-Yarra River, 9 m. above its mouth; founded, 1837; became the see of a bishop, 1847; made capital of newly formed colony of Victoria, 1851. It is one of the most important ports commercially in the British colonies; has a large trade with the mother country and with the U. S.; exports gold, wool, hides, tallow, and various other raw produce; and was the first meeting place of the parliament of the new Australian Commonwealth, 1901. The notable buildings include the Parliament House, university, national gallery, industrial museum, post office, public library, hospital, and mint. Pop. (1907) including suburbs 538,000.

Mel'chites, (1) a name applied to the orthodox Christians of Egypt to distinguish them from the Jacobites (monophysites). (2) An Eastern Arabic-speaking branch of the Roman Church, worshipping according to the rites and ceremonies of the Eastern or Greek Church, but acknowledging the supremacy of the Roman See.

Melchizedek (mél-kiz'è-dék), or **Melchisedec** ("king of righteousness"), according to Genesis xiv, 18, a "priest of the most high God" and "king of Salem," who blessed Abraham on his return from the pursuit of King Chedorlaomer, and in return received a tenth of the spoils. The Epistle to the Hebrews (vi, 20, vii, 1–21) represents him as a type of Christ, and his office as superior to the Aaronic priesthood. Salem was a poetical name for Jerusalem.

Melchthal (mélch'täl), **Arnold von**, one of the legendary founders of Swiss independence, a native of Unterwalden. According to the story, the Austrian bailiff had Arnold's father blinded for refusing to disclose the place of

refuge of his son, who had assaulted the bailiff's man while the latter was seizing oxen belonging to the family. Young Melchthal was joined in his retreat on the Grütli by Fürst, Stauffacher, and thirty other patriots, who in November, 1307, took an oath to devote their lives to Swiss independence. This was effected by the expulsion of the Austrians from the cantons of Unterwalden, Uri, and Schwytz.

Meleager (mél-è-à-jér), in Greek mythology, according to one legend, the son of Mars and Althæa, and to others, of Ceneus and Althæa. The prevailing legend is, that while Meleager was at Calydon, Etolia, Diana sent a monstrous boar to ravage the fields because the king had neglected her sacrifice. Joining with other heroes in the chase, celebrated as the Calydonian hunt, Meleager killed the boar. Ancient artists were fond of depicting Meleager and the boar hunt. A number of statues have come down to us. Chief among them are those in the Berlin and Vatican museums.

Meleagrid'idae, family of gallinaceous birds containing the turkeys. The family is at present limited to two species—(1) the common turkey, *Meleagris gallopavo*, and (2) the rare and beautiful turkey, *M. ocellata*, of Honduras. The common turkey shows four local races or subspecies—*M. gallopavo*, of the N. U. S.; *M. g. ocellata*, of S. Florida; *M. g. mexicana*, of the Mexican uplands; and *M. g. ellioti*, of the Mexican lowlands and S. Texas.

Melegnano (mā-lén-yā'nō), town; province of Milan, N. Italy; between Milan and Piacenza. In September, 1515, Francis I of France here signally defeated the Swiss in the service of the Duke of Milan. This engagement is called the "battle of the giants," from the great valor displayed on both sides. The French were again victorious here, June 8, 1859. Pop. (1901) 6,666.

Mele'tius, abt. 240–326; author of the Meletian schism; b. Egypt; became Bishop of Lycopolis abt. 300; occasioned the schism by assuming the episcopal functions of Peter, Bishop of Alexandria; for this was excommunicated and deposed by a synod abt. 306. The Council of Nice, 325, condemned his conduct in resisting the synod; but twenty-nine bishops adhered to him. After apparently submitting to the Nicene decision, he resumed his episcopal functions. This schism disappeared early in the fifth century.

Mel'fi, town; province of Potenza, Italy; about 28 m. from Potenza; was a large town, 304 A.D., and its mediæval story is one of the most stormy of these turbulent times. In 1528 the French general Lautrec de Foix took Mel'fi after an obstinate resistance, and slew 18,000 of its inhabitants. Pop. (1901) 14,649.

Melicertes, son of Athamas and Ino, who fled with him in her arms when she was being threatened with death by Athamas because of her attempt to murder Phrixus and Helle, children of Athamas by Nephele. Ino leaped from the Scironian rocks into the sea with Melicertes still in her arms. Both mother and son escaped unhurt, and were changed into sea

divinities, who were worshiped especially at Megara, on the isthmus, and at Corinth. Ino was worshiped as Leucothea, and Melicertes as Palamon.

Mel'ikoff. See **LORIS-MELIKOFF.**

Mellaro'sa. See **BERGAMOT.**

Melodra'ma, name first bestowed on the opera by Rinuccini, but now more frequently given to a nonoperatic play of a semitragic or serious character, and marked by sensational, effective, or startling situations, and by exaggerated sentiment.

Mel'ody, in music, a connected series of single sounds, so arranged and linked together as to become capable of expressing some sentiment, and stirring up pleasurable, religious, patriotic, warlike, tragic, or other emotions. The music of the ancient Greeks appears to have been of a type not unlike this, however admired and extolled in its own day, when true melody was unborn, and music and noise were nearly akin. To our perceptions the music of the ancients seems to have consisted of a mere succession of intervals, selected without taste and refinement, and laid together without skill, design, or any trace of elegance and inspiration. The fragments that remain to us of such music, while valuable as curiosities and historical relics, are yet so sterile as to yield no indications of that connection of thought and richness in ideas which we look for now in what bears the name of "melody." In the conception or formation of melody far more is implied than the mere arranging of several sounds or notes in any haphazard order of succession. Considerations of key and scale, mode, rhythm, time, accent, cadence, and rules affecting the progressions of certain intervals, are all to be taken into account if from any series of notes we would form a melodious strain, having meaning and design. See **HARMONY**; **MUSIC**.

Mel'on. See **MUSKMELON**; **WATERMELON**.

Me'los. See **MILÓ.**

Melpomene (mél-póm'ē-nē), in Greek mythology, the muse of tragedy. She is generally represented as wearing the cothurnus, with a wreath of vine leaves on her head, a sword or the club of Hercules in one hand, and a crown or scepter in the other.

Melrose' Ab'bey, celebrated ruin in Melrose, Roxburghshire, Scotland, near the Tweed, 31 m. SE. of Edinburgh; was founded, 1136, by David I; completed, 1146, and dedicated to the Virgin Mary. In 1322 it was destroyed by the English army of Edward II, but was soon rebuilt by Robert Bruce. The church, the only part of the ancient monastery remaining, is one of the best preserved specimens of Gothic architecture.

Melun (mè-lūn'), town of France; capital department of Seine-et-Marne, 25 m. SE. of Paris; partly on an island in the Seine, but the finest portion of the town occupies the right bank. The church of St. Aspais is a

lofty edifice of the fifteenth century. The manufactures include cloth, woolen and cotton goods, and earthenware. Melun was besieged by the Normans, and several times by the English. Abelard opened a school of philosophy in this town, which was at that time a favorite resort of the court. Pop. (1901) 10,662.

Mel'ville, George John Whyte, 1821-78; Scottish novelist; b. near St. Andrews; entered the army, 1839; became captain in the Coldstream Guards, 1846, and retired, 1849, but served again in the Turkish cavalry during the Crimean War; wrote several novels, which became popular in both Great Britain and the U. S.; among them "Captain Digby Grand," "Holmby House," "The Gladiators," "Sarchedon," and "Katerfelto."

Melville, Herman, 1819-91; American novelist; b. New York; shipped as a common sailor when eighteen years old; deserted, 1842, from a whaling ship at the Marquesas Islands, remaining four months a prisoner in Typee (Taipi) Valley, Nukahewa; escaped, and returned, 1844, to the U. S.; published "Typee," "Omoo," "Mardi," "Redburn," "White-Jacket," "Moby Dick," "Pierre," "Israel Potter," "The Piazza Tales," "The Confidence-Man," "Battle Pieces and Aspects of the War," poems; "Clarel," a poem; "John Marr and Other Sailors," a story, privately circulated; "Timoleon," poems.

Melville, island of British N. America; in the Arctic Ocean; bounded W. by Fitzwilliam and Kellet straits, SE. by Melville Sound, and SW. by Banks straits; was discovered, 1819, by Parry, who wintered here with his crew, and further explored, 1851, by McClintock.

Mem'brane, thin layers of tissue, more or less elastic, whitish or reddish, lining either closed cavities or canals opening externally, absorbing or secreting fluids, and enveloping various organs. The simple membranes are either mucous, serous, or fibrous. The mucous membranes line cavities having external communications, such as the mouth, intestinal canal, urinary passages, and air passages. They are continuous with the skin, having a similar structure, the exterior layer corresponding to the epidermis, and composed of different forms of epithelium. A number of secreting glands are situated in the mucous membrane of the intestinal canal, furnishing digestive fluids. Mucous membranes are generally endowed with keen sensibility at their junction with the skin, as on the lids, lips, etc., but gradually become less sensitive and finally almost insensible, in a healthy state, in the interior of the organs.

Serous membranes are formed of fibrocellular tissue, covered with epithelial cells; they are very thin, smooth, transparent, and extensible; they are closed sacs, and are found wherever internal organs come in contact with each other, as the ends of bones forming movable joints, or lie in cavities where motion is required, as in the thoracic and abdominal organs. They consist of two layers, the first surrounding the organ itself, and the second

reflected upon the parts with which it is in contact and on which it moves; the cavity is lubricated by a serous fluid, exuded from the surface of the membrane. Bichat gives the name of fibrous membranes to the aponeuroses of muscles, the capsules of the joints, the sheaths of the tendons, etc.; these are never free, but are in contact with and adherent to the parts surrounding and not moistened by secreted fluid.

Membré (mān-brā'), Zénobius, 1645-89; Franciscan missionary; b. Flanders; was sent to Canada, 1675; descended the Mississippi with La Salle; wrote a narrative, published by Le Clercq in his "Établissement de la foi"; returned to France, 1682; accompanied La Salle on his expedition to the mouth of the Mississippi; was left at the fort in Texas; and was killed by the Indians.

Memel (mā'mél), extreme N. town of Prussia; on the Baltic Sea; 70 m. NE. of Danzig; is fortified and well built, and is the center of the Baltic timber trade. The other principal exports are grain, linseed, hemp, flax, hides, and tallow. The important manufactures are articles of amber, soap, and brandy. There are iron foundries, chain factories, and many saw mills, and considerable shipbuilding. Pop. (1900) abt. 20,000.

Mem'non, hero of the Trojan War, slain by Achilles. Homer says he brought a force of Ethiopians to the assistance of the Trojans. The Greeks in later ages confounded him with the Egyptian king Amenophis (Amen-hotep) III, whose colossal statue near Thebes excited their wonder by its vocal powers. It is the northernmost of two colossal sitting figures of black stone, in the quarter of W. Thebes called Memnonia by the Greeks. The height of each of these statues is 47 ft., and they rest on pedestals about 12 ft. high. The sound is said to have resembled the twanging of a harp string or the striking of brass, and it occurred at sunrise or soon after. The stone in the lap of the statue, when struck with a hammer, rings with a metallic sound; and as there is a square hole in the body just behind this, it is conjectured that the sound was produced by a person concealed therein. Another theory is that the sound was the effect of the expansion of this stone by the sun's rays.

Memno'nium, building at Abydos (Egyptian *Abet*), located 8½ m. W. of the Nile in Upper Egypt. This designation, probably derived from the Egyptian *mennu*, monument, was first applied in the Alexandrian period. The building is described by Strabo as one of great magnificence. It was quite different in purpose from the ordinary temple, being a mortuary sanctuary devoted to the memory of the builder and his ancestors. Its ground plan resembles the letter L. It was begun by Seti I and continued by Rameses II, as is shown by an inscription dating from the latter's first year. The most important information which it has furnished is found in the "Tablets of Abydos," engraved on one of the walls of an interior passageway. This tablet contains the names of seventy-six Pharaohs arranged in

three rows, the lower of which is devoted to the name of Seti I, the same being repeated in the form of both prenomens and name nineteen times. The list is more important and complete than any other which the monuments have preserved.

Memo'rial Day. See DECORATION DAY.

Mem'ory, the power which living nervous tissue has to revive impressions which it once had, with the additional impression that it has had them before. The basis of a good memory is a healthy nervous system, supplemented by well-developed sense organs. Mental fatigue is fatal to memory. To produce retentiveness there must be a freshness and plasticity which responds spontaneously to the stimulus of the senses. Next to healthy nerves and brain comes the habit of attention. Innumerable sensations are constantly being made upon us, but only those which we attend to are remembered. The training of the attention to prevent the weakening habit of mind wandering is essential to strengthen the memory; for the majority even of educated persons find it difficult to keep their minds concentrated on one subject for more than a few minutes at a time. Attention is dependent upon character, interests, and daily life. The mind of an artist, a policeman, or a society lady, walking along the same street, record very different impressions of the same subject-matters. Continuity of attention may be strengthened by frequently recalling a series of facts or mental images, each linked to the one preceding it. The trains of thought involved in proving geometrical problems are useful for this purpose, but the recalling of any series—the kings of England, the presidents of the U. S., the topography of our native city—are useful, the important object of the drill being not so much the imbibing of useful knowledge as the acquiring of the valuable power to consciously direct one's attention, in total disregard of all the wandering fancies that thrust themselves into consciousness.

There is a low form of spontaneous memory, as of servants, and even imbeciles, who could repeat pages in a language they did not know on hearing them read once, or of a farmer who could remember the state of the weather every day for forty-two years. These are but freaks of the mind, and generally a good memory is more likely to be associated with genius than with mediocrity. Indeed, good memory is a condition of successful accomplishment in any work. The choice of what that memory shall consist of depends greatly upon character. Elihu Burritt, "the learned blacksmith," could master language after language; while it is an everyday experience to hear a schoolboy who can barely stumble through his declensions rattle off a detailed and accurate account of the records of many baseball teams. Some people can call up a scene very vividly, with the outlines, colors, etc., of the original objects; others can do this very imperfectly, if at all. With some the train of ideas is habitually accompanied by visual pictures, with others by sounds, with others by impulses to movement, especially if they

appeal to two or more senses. In learning the letters, a child should see them, and hear them, and name them, and draw them. Memory is not a separate function of the brain, but belongs to all mental functions alike. There may be a strong "visual memory" with a weak "auditory memory," etc. Indeed, when some particular part of the brain is injured or diseased, there may be a total blank with respect to certain "memories," as of speech or movement. See APHASIA.

The natural strengthening of the memory, beyond the cultivation of health and attention, is aided by habits of order in life and thought. It is a truism that if things are kept in their places we know where to find them, and a disregard of method and the frittering away of mind upon innumerable passing thoughts force a heavy drain upon available nerve energy. Here concentration is the one virtue. Much reading of newspapers or novels induces mind wandering, forgetfulness, and incapacity for consecutive thought and memory. The matter to be remembered should be simplified as much as possible. Making abstracts of what is read will economize the many efforts of memory; and the association of ideas is helped by their being presented in logical order.

Experiments have also been made measuring the time required for one idea to suggest another and for an act of memory. Thus it takes about half a second to name an object or a familiar color, whereas words, owing to the habitual association, can be named more quickly. The time required to name words in a foreign language measures familiarity with the language. It takes about a third of a second to add two numbers and about half a second to multiply them. Thus, also, has been measured the time required to remember in what country a city is situated, who is the author of a given work, etc. In this way individual differences may be determined, readiness and retentiveness compared, methods of education studied, etc. Ordinary accuracy of observation and recollection has been studied experimentally. Thus, when a class of fifty-six college students was asked what was the weather a week ago, 16 answered clear; 12, rain; 7, snow; 9, stormy; 6, cloudy; and 6, partly stormy and partly clear. Such experiments, measuring the values of testimony, have important applications in the courts of justice and in other directions. See MNEMONICS.

Mem'phis (Coptic, *Menſt* or *Menofre*; in Scripture, *Noph* or *Moph*), ancient capital of Egypt; on the W. bank of the Nile; 10 m. S. of the modern city of Cairo. Its foundation is ascribed to Menes, the first king of Egypt, and it was the first capital of the united kingdom of Upper and Lower Egypt. It controlled the inland trade, and was the chief seat of learning and of religion, the principal place of the worship of the god Ptah, and the chosen residence of the sacred bull Apis, whose temple here was celebrated. The other great temples were: that of Isis, completed by Amasis, 564 B.C.; that of Serapis, to which was attached a Nilometer; that of Phra or the sun; and that of Ptah, the most ancient of all, and the largest and most

superb. Memphis was the seat of the third, fourth, fifth, seventh, and eighth dynasties of Egyptian history, and was also the capital of the shepherd kings. The Persians made it the metropolis of their African possessions, and it continued to be the chief city of Egypt until the foundation of Alexandria, after which it declined. The remains of Memphis extend over many hundred acres of ground.

Memphis, capital of Shelby Co., Tenn.; on the Mississippi River, at the head of navigation for large vessels; laid out, 1820; incorporated as a city, 1831; surrendered its charter and became a "taxing district," 1879; reincorporated as a city, 1891. It is the principal commercial point on the Mississippi between St. Louis and New Orleans; is built on a bluff 80 ft. above low and 40 ft. above high water; has a long water front, with massive, stone-paved wharves; and is the center of a large trade, facilitated by numerous railways and steamboat connections with points on the Mississippi and other regions that seek an outlet in the Gulf of Mexico. Its manufacturing interests are large, important, and rapidly increasing. According to the U. S. census of 1909, it had 329 "factory-system" plants, operated on a capital of \$26,968,000, and yielding products valued at \$30,242,000.

The city is regularly and attractively laid out; has been provided with a thorough system of sewerage since the epidemic of yellow fever, 1878 (which bankrupted the city), and a water service by the Holly system; has a steel railway bridge across the Mississippi, the third largest cantilever bridge in the world, opened 1892; and contains a U. S. Govt. building, Cotton Exchange, Merchants' Exchange, Christian Brothers' College, University School, Memphis Hospital Medical College, Hannibal Medical College, Conway Institute, and other institutions. On June 6, 1862, a short engagement took place near Memphis, in which the Confederate fleet of eight vessels, under Commodore Montgomery, was defeated by the Union fleet of fourteen vessels, under Commodore C. H. Davis, and the city was thenceforth occupied by Union forces; in August, 1864, Gen. Forrest's Confederate cavalry entered and took several hundred prisoners. Pop. (1910) 131,105.

Memphremagog (mēm-frē-mā'gōg), Lake, picturesque body of water, partly in Vermont and partly in Quebec, Canada; about 35 m. long from N. to S. and from 2 to 5 m. wide; discharges through Magog River into the St. Francis, and thence into the St. Lawrence; is studded with islands, and abounds in fine fish.

Menabrea (mā-nā-brā'ā), Luigi Federico (Count), 1809-96; Italian statesman; b. Chambery; entered the Sardinian Corps of Engineers; became Prof. of Technical Science in the Military Academy and in the Univ. of Turin; was employed on diplomatic mission to the Italian duchies to prepare them for annexation, 1848; was chief of staff, fortified Bologna, and conducted the siege of Gaeta, in war against Austria, 1859; became count and Minister of Marine, 1861; built the arsenal at

Spezzia; formed a cabinet and took charge of Ministry of Foreign Affairs, 1867; resigned, 1869; ambassador at Vienna, 1870; London, 1876, and Paris, 1882-92.

Menai (mēn'ī) Strait, narrow channel, 13 m. long and from 250 yds. to 2 m. wide, between the island of Anglesea and Carnarvonshire, Wales, crossed by two bridges, the suspension and the Britannia bridge. At the entrance of the channel the tide sometimes rises 30 ft., and ordinarily from 10 to 12 ft. The navigation is difficult, but, as it saves time, the route is often chosen by vessels under 100 tons burden.

Menam (mā-nām'), or **Meinam** (mā-ē-nām'), principal river of Siam, of which it drains almost all of the W. half; rises in the mountains to the N. and NW. of the kingdom, and after a S. course of about 750 m. falls into the Gulf of Siam by a single estuary about 20 m. S. of Bangkok. Its largest affluent is the Menam-Phe, which drains central Siam and joins the main stream from the NE. in the neighborhood of Ayuthia or Krung-Kao.

Menander, 342 B.C.-291; Athenian dramatic poet; is said to have drowned while swimming in the harbor of Piræus; was the greatest poet of the new comedy, which he purified from the coarseness and buffoonery of the old. His comedies were numerous, and maintained their place on the stage for several centuries. Terence largely borrowed from Menander.

Menasseh ben Is'rael. See MANASSEH BEN ISRAEL.

Menchikoff (mēn'chī-kōf). See MENTCHIKOFF.

Mencius (mēn'chī-ū), Latin form of the name of Meng-tse or Mang-tsze, a Chinese philosopher, who flourished during the fourth century B.C. He is said to have been the pupil of a disciple of Tsze-sze, grandson of Confucius. He was the author of the fourth of the "Canonical Four Books," named after him "Māng-tsze," which contains a record of his dialogues with various characters. The main object of his teaching was to commend the practice of benevolence and integrity.

Mendē'ana. See MANDÆANS.

Mendaña (mēn-dān'yā) Archipel'ago. See MARQUESAS ISLANDS.

Mendelssohn (mēn'dēls-sōn), **Moses**, 1729-86; German metaphysician; b. Dessau, Anhalt, of Jewish parents; studied the Bible, the Talmud, Maimonides, and afterwards also modern literature; became, 1750, tutor in a rich Jewish family in Berlin, and, 1754, bookkeeper in the firm. An accidental acquaintance with Lessing soon grew into an intimate friendship, and Lessing is said to have taken Mendelssohn as a model for his "Nathan." He also associated with Nicolai, Abbt, and other literary persons, and began, 1755, to write for different periodicals. In 1763 his treatise on the "Evidence of Metaphysics" received a prize from the Academy of Berlin. In 1767 he published his "Phädon," a dialogue on the immortality of the soul, which won a European celebrity. In

1783 appeared his "Jerusalem"; 1785, his "Morgenstunden," which exercised a considerable influence on his coreligionists.

Mendelssohn-Bartholdy (-bär-tōl'dē), **Felix**, 1809-47; German composer; b. Hamburg; at eight years of age could read any music at sight and write correct harmony, and at twelve composed his piano quartet in C minor. His first compositions were published, 1824, his "Midsummer Night's Dream," 1826. In 1829 he left Berlin to travel through Scotland, England, Germany, Italy, and France. In 1833-35, was musical director of the city of Düsseldorf; then moved to Leipzig, where he lived till his death, excepting during short periods of time—once to go to Berlin as director of music to the King of Prussia. Among his other best-known works are the oratorios "Elijah" and "St. Paul," the Forty-second Psalm, the concerto for the violin, the first concerto for the piano, the third symphony (in A minor), the overture, "Fingal's Cave," and his chamber music, "Songs without Words," for the piano.

Men'denhall, **Thomas Corwin**, 1841- ; American physicist; b. Hanoverton, Ohio; Prof. of Physics and Mechanics in Ohio State Univ., 1873-78; of Physics in Imperial Univ. of Japan, 1878-81; in U. S. Signal Corps, 1884-86; president Rose Polytechnic Institute, Terre Haute, Ind., 1886-89; superintendent U. S. Coast and Geodetic Survey, 1889-94; president Worcester (Mass.) Polytechnic Institute, 1894-1901. In 1892 he was one of the two commissioners who represented the U. S. in the Bering Sea joint commission, and in the same year was appointed commissioner on the part of the U. S. to make a joint survey of the boundary between Alaska and British America; also commissioner to fix, in connection with a representative of the British Govt., the boundary between Canada and the U. S., in the St. Croix River, and Passamaquoddy Bay. He was president of the American Association for the Advancement of Science, 1888; chairman of the U. S. Board on Geographic Names from its organization, 1890.

Mendiburu (mēn-dē-bō'rō), **Manuel de**, 1805-85; Peruvian historian; b. Lima; joined the patriots, 1821; was captured by the Spaniards and kept a prisoner until the end of the war; subsequently held many civil and military offices; was Minister of War under Gamarra and of Finance under Echenique; and, 1851, was sent on a special mission to Europe. He had collected an immense quantity of material for a history of Peru, but concluded that his abilities were not equal to the task of writing it. He therefore threw the notes into the form of a biographical dictionary, entitled "Diccionario histórico-geográfico del Perú." The first part, in eight volumes, includes the Inca and colonial periods; its publication was begun 1874 and concluded after the author's death. It is by far the best work of its kind that has ever appeared in S. America, and has been praised by scholars.

Men'dez Pin'to. See PINTO.

Mendoza (mēn-dō'thā), **Diego Hurtado de**, 1503-75; Spanish statesman and writer; b.

Granada; grandson of the Marquis de Santillana; fought in the Spanish armies in Italy; was sent as ambassador to the Republic of Venice, 1538; became military governor of Siena; was charged with the imperial interests in the Council of Trent, 1542; was afterwards plenipotentiary to Rome, and for six years was regarded as the head of the imperial party throughout Italy. Philip II banished him from court, 1567. In 1574 he was permitted to return to Madrid. His "Lazarillo de Tormes," a satirical romance, was the foundation of the whole class of Spanish fictions in the *género picaresco*, which the "Gil Blas" of Le Sage made famous throughout Europe. His principal historical work is the "Guerra Contra los Moriscos" ("War against the Moors").

Mendoza, Pedro de, abt. 1487-1537; Spanish military commander; b. Gaudix, Granada; fought with distinction in Italy; was named governor of a colony on the Rio de la Plata, and sailed from San Lucar, 1534, with fourteen ships and 2,650 men. Mendoza founded the first city of Buenos Aires, February 2, 1535, but after continued disasters, he in despair embarked for Spain at the end of April, 1537. The ship was reduced to famine; Mendoza became a lunatic and died before reaching Spain. Soon after Buenos Aires was abandoned, to be refounded after many years.

Mendoza, province of the Argentine Republic; bounded N. by San Juan, E. by San Luis, S. by Pampa and Los Andes territories, W. by Chile; area, 56,502 sq. m.; pop. (1907) 201,467. The main range of the Andes forms the W. boundary, the peak of Aconcagua being at the NW. angle; spurs and lower ranges cover nearly the whole face of the province, subsiding to hills E.; in the NW. part there are extensive arid plateaus. Wheat, corn, and fruits are grown, the latter being dried and exported; but of late years vine growing and wine making have almost superseded other industries. Mendoza was settled, 1559, by Spaniards from Chile, who easily conquered the peaceful Guarpes. It formed part of the territory of Cuyo, attached to Chile until 1776, when it was united to the viceroyalty of La Plata or Buenos Aires.

Menelaus (mēn-ē-lā'ūs), one of the Homeric heroes, King of Lacedæmon; son of Atreus and younger brother of Agamemnon, and husband of Helen. After his wife had eloped with Paris, he and Ulysses went to Troy to demand her restitution. In the war which followed he repeatedly distinguished himself. He engaged Paris, and would have killed him had not Venus interfered. Menelaus was one of the warriors concealed in the wooden horse. Having recovered Helen, he embarked for home, but was the last of the heroes except Ulysses to reach Greece.

Men'elik II, 1843-1910; King or Negus of Abyssinia; after his father's death, 1855, was held under guard by Theodore, his father's rival, until 1865, when he escaped and made himself king. He succeeded John II as negus in 1889; placed his kingdom under an Italian protectorate. Later, when hostilities broke out,

with an army trained partly after European methods, he completely defeated the Italians at Adowa, 1896, thus freeing his kingdom from foreign influence. Abdicated the throne, 1911, in favor of his nephew, Lidj Jeassu, and was reported later to have been assassinated.

Menendez de Avilés (mā-nēn'dēth dā ā-vē'lēs), Pedro, 1519-74; Spanish naval commander; b. Avilés, Asturias; distinguished himself in privateering enterprises against the Moors and French; became captain general in the navy; was twice general of the W. Indian fleet, and acquired great wealth by his voyages; was imprisoned and fined for alleged irregularities, 1560, but regained favor, and, 1565, was named governor of Cuba and Florida, with the agreement that he should colonize the latter country. Menendez founded St. Augustine (now the oldest city in the U. S.), September 8, 1565; surprised and captured the French fort on St. John's River, slaughtering most of the garrison, "not as Frenchmen, but as heretics"; in a few months hardly a Frenchman remained in Florida. The Spaniards established two other forts, but they suffered greatly from hunger and from Indian attacks; about 100 died and 500 deserted and left the colony. Subsequently large reinforcements were received, and the colony prospered. Menendez was active in the government of Cuba. He established a post on Port Royal Bay, now in S. Carolina, visited Chesapeake Bay, and, 1570, sent a party of missionaries up the Potomac River; this mission was destroyed by the Indians, and in requital Menendez ascended the Potomac, 1572, and laid waste some of the Indian villages. In 1573 he returned to Spain, and was given command of the immense fleet which Philip was preparing against England and the Netherlands, but died soon after at Santander.

Menephth'ah (the AMENOPHIS of Josephus), Egyptian king; thirteenth son, co-regent, and successor of Rameses II, the Pharaoh of the Oppression, and third king of the nineteenth Egyptian dynasty. The length of his reign is uncertain. His only war was with the Libyans, whom he conquered. By many he has been identified with the Pharaoh of the Exodus.

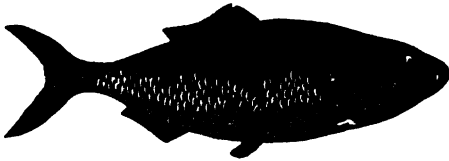
Menes (mē'nēz), the first recognized king of Egypt, being mentioned first in all the monumental lists of kings. His native place was This, or Thinis, and he is said to have founded Memphis. Manetho says that he waged war with the Libyans; Herodotus, that he founded the Temple of Ptah at Memphis; Diodorus, that he arranged the worship of the gods; Ælian, that he introduced the Apis cult at Memphis; and Anticlidēs, that he invented the alphabet. From native sources it is known that he received divine worship throughout almost all periods of Egyptian history, and the nomenclature of the kings as "King of Upper and Lower Egypt" seems to indicate that his special service was in the unification of the government of the whole land.

Menga, Raphael, 1728-79; German painter; b. Aussig, Bohemia; formed his style by copying Raphael. His earlier works are in Dresden, but he painted chiefly in Rome and in

Spain for Charles III, who appointed him his court painter. Although a foreigner he was elected president of the Academy of St. Luke in Rome. The ceiling of the Sala dei Papiri in the Vatican is one of his most important works.

Mĕng-tse (mĕng-tāth'), or **Mung-tse'**. See **MENCUS**.

Menha'den, **Moss'bunker**, or **Bon'y Fish**, fish of the herring family, extensively caught along the Atlantic coast of the U. S. The fish are put up as sardines, the bones being softened



MENHADEN.

by subjection to steam. They have been long caught for their oil, which is abundant and is used in leather dressing, rope making, and for adulterating higher-priced oils. The refuse, called fish guano, is a valuable fertilizer.

Meningitis, inflammation of the membranes enveloping the brain and spinal cord, termed cerebral, spinal, and cerebrospinal meningitis, according as the inflammatory process is limited to the region of the cerebrum or brain, the region of the cord, or involves both. Acute cerebral meningitis results from injuries of the head, as fractures and diseases of the cranial bones, inflammation and suppuration of the ear, from excessive mental labor, from perverted states of the blood, as in acute rheumatism, and from infectious fevers, such as erysipelas, pneumonia, and typhoid. The tubercular meningitis of children is the result of infection with the tubercle bacillus and the development of tubercles in the meninges. Spinal meningitis most often follows injury or disease of the vertebræ, less frequently is excited by rheumatic, gouty, and tubercular blood states. It may occur, as among soldiers in the field, from exposure in sleeping on the ground. Cerebrospinal meningitis is usually epidemic, and is but one manifestation of a malignant febrile disease, the cerebrospinal or spotted fever.

Menip'pus, Greek philosopher of the Cynic school; a native of Gadara, Syria; flourished abt. 260 B.C. His writings, a satirical medley of prose and verse, are lost.

Meniscus, a concavo-convex lens. It may be either a converging lens (thicker at the center) or a diverging lens (thicker at the edge). In other words, a meniscus is any lens the centers or curvature of whose faces are both on the same side, and whose two radii of curvature differ in length.

Men'no Si'mons, or **Symons**, 1492-1561; Dutch religious reformer; b. W. Friesland; was curate at Witmarsum when, 1536, he renounced the Roman Catholic priesthood, and,

accepting a call to be the pastor of a few Anabaptists who never had been connected with the fanatical party, organized numerous churches, principally in W. Friesland. In 1543 persecution drove him to Cologne, where a flourishing church was gathered. Driven from there, 1546, he traveled in Holstein, Mecklenburg, and Livonia, preaching and organizing churches. The last years of his life were embittered by dissensions among his adherents. His principal work is the "Fundamental Book on the saving Doctrine of Christ." See **ANABAPTISTS**; **MENNONITES**.

Men'nonites, body of evangelical Christians who, in relation to the constitution of the Church to baptism, the taking of oaths, church discipline, accepting of civil offices, and the bearing of arms, are either entirely or almost in harmony with Menno Simons, after whom they are named. They are found in Switzerland, Germany, France, Russia, and N. America. Originally the followers of Menno in Holland were called by that name, but they have departed so far from his principles and practices that for more than a century they have preferred to style themselves *Dooopsgezinden*, or persons who lay emphasis on baptism. The first church which professed all their leading principles was organized at Zurich, 1525. They spread rapidly, persecution broke out, and more than 3,000 suffered martyrdom in Suabia, Bavaria, Austria, and Tyrol. In Moravia they greatly increased until the Thirty Years' War drove them away.

When, 1527 and 1528, various leaders of the Anabaptists had perished at the stake, enthusiasts rose in their places. The chief among these was Melchior Hoffmann, a Suabian, through whom the principles of the Anabaptists, mixed with his views as to an actual millennium with Christ on earth, were first disseminated in the Netherlands. His fanatical follower, John Matthias, of Haarlem, 1533, inaugurated the atrocities of Münster in Westphalia, which, though committed by men who had deviated from the original principles of the sect, were charged to the whole body. About 6,000 of them suffered martyrdom under the rule of Philip II of Spain. It was not till 1651 that toleration was secured to them by law. Besides oppression, internal dissensions, chiefly relating to church order, greatly checked their growth. In 1801 all Dutch Mennonites were reunited in one body, and founded a theological seminary at Amsterdam. At present they enjoy full religious liberty, but their number has decreased to less than 50,000. Mennonites began to emigrate from W. Prussia to S. Russia, 1783. Here they acquired considerable wealth. By special decrees of the emperors they were exempted from military duty; but, 1871, this privilege was abolished, whereupon thousands emigrated to the U. S. The emigration of Mennonites to America began with the settlement of New York, some of them having been among the first Dutch settlers. The first church was organized, 1683, at Germantown (Philadelphia). In 1709 began a much larger emigration from Switzerland and the Palatinate. These emigrants settled in Lancaster Co., Pa.

According to recent estimates, the number of Mennonite communicants in the U. S. is about 61,700. They are most numerous in Pennsylvania, Ohio, Indiana, and Canada.

Men'on, (1) a king of Pharsalus, who was friendly to the Athenians during the Peloponnesian War. (2) A Thessalian, who was a leader of Greek mercenary troops on the expedition of Cyrus against the King of Persia, his brother. After the battle of Cunaxa Tissaphernes treacherously entrapped the Greek generals, and put them to death. Menon was among those who suffered, though he had planned to betray the Greeks.

Mensura'tion, that branch of geometry which teaches how to find, by calculation, the lengths of lines, the areas of surfaces, and the volumes of solids. As the first of these cases comes under the head of trigonometry, the word mensuration has come to be applied to the measuring of areas and volumes solely. It shows how, by means of certain boundary lines or dimensions of the figure, we can obtain the required area or volume. Thus if we are given the lengths of the sides of a rectangle expressed in terms of a unit of length, an inch or a foot, etc., the area is equal to the product of these numbers expressed in terms of a square inch or square foot, etc. Again, the area of a triangle is equal to half the product of the base into the height. From this we can derive the area of any plane figure bounded by right lines, as such a figure can always be broken up into triangles, the areas of which can be separately calculated. Among curved lines the area of a circle is equal to half the radius multiplied by the circumference. The circumference being found by multiplying the diameter by 3.14159 or π .

The volume of a rectangular parallelepiped is the product of the length, the breadth, and the depth in terms of the cubes whose sides are units of length; the volume of a pyramid is one third of the product of its height and the area of its base, from which we can find the volume of any solid bounded by planes, as such a figure can be decomposed into pyramids. In general, the determination of the length of curved lines, the area of plane surfaces bounded by curved lines, of the area of curved surfaces, and of the volume of solids bounded by curved surfaces, requires the aid of the integral calculus. The area of a sphere is found by multiplying the cube of the radius by $\frac{4}{3}\pi$.

Men'tal Heal'ing. See CHRISTIAN SCIENCE.

Menta'na, small village, 13 m. NE. of Rome, where, November 3, 1867, a small force under Garibaldi was defeated after a four hours' fight by papal and French troops, losing 1,000 in killed and wounded. On the retreat the volunteers met with the Italian army, and Garibaldi was taken prisoner.

Menshikoff (mëns'shë-köf), Alexander Danilevitch (Prince) 1672-1730; Russian military officer and statesman; b. Moscow in humble circumstances, and apprenticed to a pie baker; enlisted in the army and distin-

guished himself at the capture of Azov; became after the death of Lefort the most intimate friend and adviser of the czar, Peter the Great; was made a prince, 1707, and field marshal, 1709. For abandoning Stettin (captured by him) to Prussia without the consent of the czar, 1713, he was tried by court-martial and was sentenced to death, but finally was spared, though heavily fined, and was made Governor of St. Petersburg. He came into power again under Catharine I, and obtained absolute control of the government under Peter II. He was about to marry his daughter to the czar, when he was overtaken by a conspiracy headed by the Dolgoruki family, and was banished to Siberia, where he died.

Menshikoff, Alexander Sergeivitch, 1787-1869; Russian naval officer; great-grandson of the above; was aid-de-camp to the Emperor Alexander, 1812-14; Governor of Finland, 1831; Minister of Marine, 1836; commander in chief during the Crimean War. He lost the battles of Alma and Inkerman, but defended Sebastopol with success for several months.

Mentone (mën-tō'nā), or **Menton** (mān-tōn'), town of Alpes-Maritimes, France; on the Gulf of Genoa; 12 m. NE. of Nice. It is surrounded by villas and olive groves, and is delightfully situated on two small bays, which are separated by a point of land where the old town chiefly stands. This is shut in on the land side by mountains 3,000 or 4,000 ft. high. It is much frequented in winter, especially by consumptives. Mentone formerly belonged to the principality of Monaco. In 1848 the inhabitants joined Sardinia, and after the cession of Nice to France Prince Florenstan of Monaco renounced his right for a compensation, February 2, 1861. At the E. end of the E. Bay are the bone caves of Mentone, about 88 ft. above the Mediterranean, consisting of natural rifts in the Roches Rouges, the mountain over which the Cornice road passes. They have furnished intersecting prehistoric remains, and a nearly perfect fossil human skeleton was exhumed in one of them, March 26, 1872, which is supposed to belong to the paleolithic age. It has been placed in the Museum of Natural History in Paris.

Men'tor, in Homer's Odyssey, son of Alcimus, and friend of Ulysses, who intrusted to him the charge of his house on his departure from Ithaca. To him fell the care of young Telemachus, and Minerva assumed his form in accompanying the latter in his search for his father.

Ments. See MAINZ.

Me'nu. See MANU.

Menzaleh (mën-zā'le), name of a shallow, brackish lake in the NE. of the Egyptian delta, which covers about 1,000 sq. m. and abounds in fish. It is bounded on the E. by a part of the Suez Canal. The region was once fruitful, and was intersected by three branches of the Nile, and contained populous cities like Tanis, Avaris (Pelusium), Daphne (Tahpanhes), and Tennis.

Menzel (mën'tsəl), **Adolf Friedrich Erdmann**, 1815-1905; German historical and genre painter; b. Breslau, Prussia; removed to Berlin, 1830; became, 1856, professor at the Berlin Academy; was awarded a grand gold medal at the Berlin Exposition, 1866; second-class medal, Paris Exposition, 1867; decoration of the Legion of Honor, 1867; and of the Prussian Black Eagle, 1899, being the first artist ever thus honored. He is best known by his illustrations, principally pen-and-ink drawings or lithographs; by his illustrations to Kugler's "History of Frederick the Great" he laid the foundation of his fame as an historical painter. His works in oil include "Round Table of Frederick the Great," "Frederick at the Battle of Hochkirch," and "A Flute Concert at Sans Souci."

Menzel, Wolfgang, 1798-1873; German author; b. Waldenburg, Silesia; taught at Aarau, Switzerland, 1820-24; settled at Stuttgart, 1825; edited for many years the *Literaturblatt*; published "History of the Germans," "German Literature," tales and romances, mythological works, and sketches of travel; gained for a while notoriety by attacking Goethe, and denouncing the members of Young Germany, the sale of whose writings he caused to be prohibited.

Mephistopheles (méf-is-tōf'ē-léz), name of a personification of the principle of evil, first occurring in the popular books and puppet plays of the Middle Ages. Its etymology is uncertain, but most probably it is derived from a Hebrew root which signifies "one who loves lies."

Mercantile (or **Commercial**) **Agencies**, institutions established to obtain information as to the character, personal responsibility, and financial standing of individuals, firms, or corporations. The service of the agency is principally in the direct interest of its subscribers, who receive, on application, the information desired, and also the use of a printed volume containing the names and ratings of those reported. The great agencies of the U. S. comprehend in their work the entire list of names of persons and business organizations recognized in the mercantile community, and to do this have established offices in all commercial centers of the country, attaching to each a certain district—first, for the purpose of gathering, formulating, and distributing the necessary information through their own employees and correspondents, and, second, to give merchants in each section the benefits of the system. The entire American continent is covered by these investigations, and through the extension of the system similar information is supplied with regard to the financial standing of those engaged in business in Europe and Australia.

Mercantile Law, the body of special rules which govern merchants as distinguished from persons not engaged in trade. Mercantile law is a part of the natural or municipal law of each state and its rules are subject to change by local legislation; but historically it is a product of international usage. The commer-

cial customs of the ancient world were reduced to a clear and simple form by the Roman jurists in their "law of nations" (*jus gentium*). In the Middle Ages the mercantile customs of the Italian cities were vividly recognized and became the "law merchant" (*lex mercatoria*) of the mediæval world. From this source is derived the modern law of trade marks, of partnership and of stock companies, of agency and brokerage, of banking, of negotiable papers and of bankruptcy, of maritime law, and especially of marine insurance. Two of the oldest statements of the mediæval law merchant are (1) the *Charte d'Oléron* or *Jugemens d'Oléron* (an island near La Rochelle), parts of which date back to the twelfth century, and which was not only received as authority in Flanders, Holland, and England, but was also incorporated in the N. German *Waterrecht* (known later as the law of Wisby); and the (2) *Costumes de la mer*, known later as the *Libro del Consolat del Mar*, a compilation made at Barcelona, which was extensively circulated throughout Europe in the fourteenth century (especially in the Italian version, *Il Consolato del Mare*), and enjoyed the highest credit.

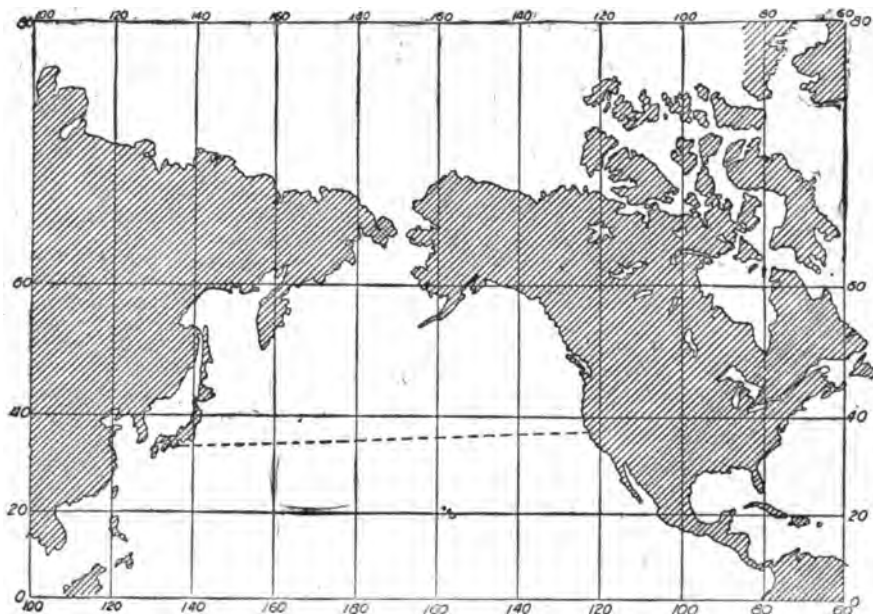
The modern states of Europe have generally adopted commercial codes, the French code having served as a model for many countries. The recognition of mercantile customs by English courts dates back to an early period and the incorporation of the law merchant into the English common law is especially associated with the names of Lord Chief Justice Holt and Lord Mansfield. The recent tendency is to make the mercantile laws as uniform as possible by the adoption of partial codes covering certain branches. Thus the English Negotiable Instruments Act has become the law in many of the states of the U. S., and promises to abolish all local distinctions in the treatment of its important subject-matter. The various headings of mercantile law are separately treated.

Mercap'tan, one of a class of compounds first made by Zeise, 1833. It contains sulphur, carbon, and hydrogen (its formula is $C_2H_4S_2$), and is analogous to ordinary alcohol. If all the oxygen is removed from the latter and sulphur introduced in place of it, the product is mercaptan. This substance is now made on a large scale, as it is required in the preparation of sulphonal.

Merca'tor, **Gerard** (real name **KRÄMER**), 1512-94; Flemish geographer; b. Rupelmonde, Flanders; studied philosophy, mathematics, and the art of engraving at Louvain; first attracted attention by two superb globes he made, 1541, for Charles V; moved, 1559, to Duisburg, where he was appointed cosmographer to the Duke of Cleve; published several valuable geographical works giving maps and descriptions of the world—Europe, France, Germany, and the British Isles. His method of laying down charts and maps, by a projection of the surface of the earth in *plano*, is still in use. His principal works are "Tabulae Geographicae ad mentem Ptolemæi Restitutæ" and "Atlas, sive Geographicae Meditationes."

Mercator's Projection, that kind of projection used in making a map or chart in which meridians are represented by parallel straight lines, and circles of latitude by lines perpendicular to the meridians. Longitudes are plotted from a scale of equal parts, and latitudes from a varying scale so adjusted that the line showing a ship's course shall be a straight line making with the meridians an

wards practiced medicine in Virginia. At the outbreak of the Revolution he was commissioned colonel of a Virginia regiment, and became brigadier general with the command of the flying camp organized in the spring of 1776. He accompanied Washington on his retreat through New Jersey, and rendered valuable assistance at the battle of Trenton. In the action at Princeton he led the vanguard,



MERCATOR'S PROJECTION.

angle equal to the course. The result is that the scale of the map increases from the equator toward either pole. In projecting a chart on Mercator's projection the earth is supposed to be a perfect sphere, and one minute of longitude at the equator, or one geographic mile, is taken as a unit. The parallels of latitude at the bottom and top, beginning at some meridian, are divided into equal parts, each of which contains some convenient number of minutes; the extreme meridians are divided into parts which continually increase in passing from the equator toward the pole; these parts are taken from a table of meridional parts corresponding to a convenient number of minutes, usually the same number that is employed on the parallel of latitude; the corresponding points are united by straight lines, and the outlines of continents, islands, oceans, and the like are then laid down from their known geographical positions with such other information as may be useful to the navigator. This draws the land masses out of proportion, as it makes them too long from E. to W. as the poles are approached. But the practical advantages of the projection outweigh this objection.

Mer'cer, Hugh, abt. 1721-77; American soldier; b. Aberdeen, Scotland; was a surgeon in the army of the Young Pretender, and after-

wards practiced medicine in Virginia. At the outbreak of the Revolution he was commissioned colonel of a Virginia regiment, and became brigadier general with the command of the flying camp organized in the spring of 1776. He accompanied Washington on his retreat through New Jersey, and rendered valuable assistance at the battle of Trenton. In the action at Princeton he led the vanguard,

Mer'cersburg Theol'ogy, name given to the movement within the German Reformed Church of the U. S. because it originated in the theological seminary of that body at Mercersburg, Pa., which grew out of the doctrines embodied in Dr. Schaff's inaugural address, as theological professor there, on the "Principles of Protestantism," which was translated and indorsed in an introduction by the other theological professor, Dr. J. W. Nevins, 1845. Its distinctive points were: (1) The Christo-centric idea of theology. (2) The Church, the body of Christ, like the human body, passes through various stages of development, in each of which it properly discards features of the previous stage (in this way mediæval Romanism was justified, and likewise its rejection by the Reformers). (3) A liturgical worship was commended.

Mer'cia, largest and most powerful of the seven Saxon kingdoms in England; comprised the central part of the country from the Thames to Yorkshire. It was an independent state, 585-825, with the exception of a short period when it was subdued by Northumbria. In 825 it was conquered, and merged into the Kingdom of Wessex.

Mercier Désiré, Joseph, Cardinal, (1851-); professor of philosophy at Malines, Belgium, and at Rome; became archbishop of Malines in 1906, and cardinal in 1907. His pastoral letter of Christmas, 1914, a courageous indictment of Germany, led the German authorities to forbid him to leave his episcopal residence at Brussels, an act which drew on Germany an energetic protest by the Pope. Throughout the World War he displayed supreme patriotism and absolute fearlessness, and after its close he declared that the Americans had saved the world. He visited the U. S. in the fall of 1919, to express the gratitude of Belgium.

Mercier (mër-sè-ä'), Honoré, 1840-94; Canadian politician; b. at St. Athanase, Quebec; was called to the bar in 1867. He vigorously opposed the confederation of the provinces.

Mercury (named from the god Hermes or Mercury) planet which travels nearest to the sun at a distance of nearly four tenths that of the earth. When near its greatest E. elongation, which occur at intervals of four months, it may be seen in the W. half an hour to an hour after sunset. Its position makes it hard to study, and little is known about it. It is 3,500 m. in diameter, is 35,392,000 m. from the sun, round which it revolves in about eighty-eight of our days. It revolves on its own axis in twenty-four hours, five minutes, thirty seconds. Mercury passes between the earth and sun more than three times in each year, and when during one of these passages it is near its nodes it appears to pass across the face of the sun. Such an occurrence is called a transit of Mercury, and, though less important than a transit of Venus, is yet of interest to astronomers. Transits of Mercury occur at intervals of thirteen, seven, ten, three, ten, three, etc., years, always either in May or November. The following table shows the transits that will occur before 1941, and the Atlantic times of middle of transit:

1914, Nov. 7th.....	7h. 5m. A.M.
1924, May 7th.....	8h. 34m. P.M.
1927, Nov. 10th.....	45m. A.M.
1940, Nov. 11th.....	6h. 22m. P.M.

Mercury, Hydrargyrum (hi-drär'jî-rûm), or **Quick'silver**, only simple metal which is liquid at the ordinary temperatures; occurs as a native metal, like gold, silver, copper, etc., and has been known to mankind from time immemorial. Its chlorides were also known of old—*corrosive sublimate* and the *red oxide* to the Arabians, and *calomel* to the alchemists. Its sulphide, *cinnabar*, has been used as a pigment from the most ancient times. Besides the native metal, it occurs chiefly as cinnabar, its most abundant ore. The most famous localities in the U. S. are in New Almaden and New Idria, Cal., named after the two most productive European localities, Almaden in Spain and Idria in Carniola. Pure mercury is almost silver white, of mirrorlike luster, which luster it preserves perfectly in air free from sulphur. Like silver, it is tarnished superficially by sulphurous emanations. Dust also may adhere and tarnish it, but it is readily restored to perfect brilliancy by straining, or even by pouring through a glass funnel,

to which the dust or tarnish films will adhere. The worse enemies to its purity are *other metals*. No metal should ever be allowed to touch it except iron or platinum.

Mercury when pure has a density of 13.596 at 0° C. (32° F.). When it is frozen, which requires a reduction of temperature to about 39° F. below zero, it forms a tinlike mass, which is crystalline, but malleable. It boils, when pure, at 357.25° C. (675° F.), yielding a transparent, colorless vapor 6.7 times as heavy as air. When exposed to the air at or near its boiling point, it is slowly oxidized to the red oxide, which, when exposed again to a still higher heat, is decomposed into its elements. The most important commercial use of mercury is in the working of the ores of gold and silver. It is also used in the amalgamation of the zincs of voltaic batteries, in making looking glasses, in barometers, thermometers, steam gauges and other pressure gauges, in dental amalgams (with copper). In the laboratory it is a valuable agent in eudiometry (for confining gases), in mercurial pumps, and in other ways. It is used for preparing several important medicinal compounds, including calomel and corrosive sublimate.

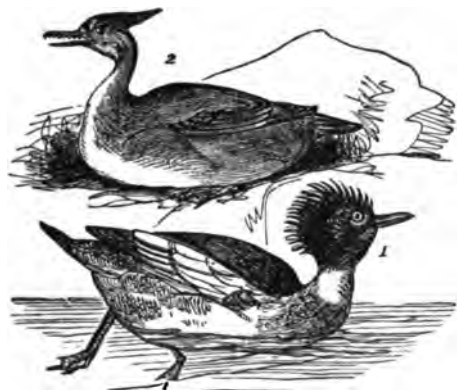
Mer'cy, Sis'ters of, or Order of Our La'dy of Mercy, religious order founded in Dublin by Miss Catharine McAuley, 1830. The rule of St. Augustine, modified to suit the active duties of the sisterhood, was adopted by them, approved by Gregory XVI, 1835, and formally confirmed by him, 1840. The Sisters of Mercy have in view, besides other charities, the visitation of the sick and prisoners, the instruction of poor girls, and the protection of virtuous women in distress. They are subject to the bishops, and have no general superior. The sisterhood is divided into two classes, choir sisters and lay sisters. The habit of the order is a black robe with long loose sleeves, a white coif, and a white or black veil. In the streets a bonnet of black crape is worn instead of the coif and veil. The order spread rapidly over Great Britain and her colonies, and the sisters have numerous institutions throughout the U. S.

Mer'edith, George, 1828-1909; English novelist and poet; b. Hampshire; studied law, but early devoted himself to literature; published novels and stories, including "The Shaving of Shagpat," "Farina: a Legend of Cologne," "The Ordeal of Richard Feverel," "Evan Harrington," "Emilia in England," now called "Sandra Belloni," "Vittoria," "Rhoda Fleming," "The Adventures of Harry Richmond," "Beauchamp's Carer," "The Egoist," "The Tragic Comedians," "A Diana of the Crossways," and "The Amazing Marriage"; also "Poems," "Modern Love and Poems of the English Roadside with Poems and Ballads," "Poems and Lyrics of the Joy of Earth," "Ballads and Poems of Tragic Life," and "A Reading of Earth."

Meredith, Owen. See LYTTON.

Mergan'ser, name given to several birds of the family *Anatidae*, differing from the true ducks in having a slender bill, slightly hooked

at the tip, armed with little recurved processes which serve as teeth. This style of bill has earned for the mergansers the popular name of sawbill. Another common name in the



RED-BREASTED MERGANSER (*Mergus serrator*).

1. Male. 2. Female.

U. S. is sheldrake. The mergansers are expert divers and feed on fish. The males are handsome birds with a striking plumage of black and white. The largest species is the goosander (*Mergus merganser*), common to the Old and New Worlds.

Merger, in law, the absorption or extinguishment of one estate, right, or interest by another of a higher grade, when both become vested in the same person in one and the same right. The doctrine has generally found its principal application in the law of real estate; but within recent years, and especially in the U. S., it has been applied to combinations of large financial interests of a common character, such as railroads and competing corporations.

Merian (mă-rē-ăn), *Matthæus*, 1593-1650; Swiss engraver; b. Basel; abt. 1623 settled in Frankfurt as engraver on copper, and afterwards started a publishing house which was continued by his heirs. His most important work is the immense series of plates of the cities, towns, villages, and castles of France and Germany. He is known as "the elder" to distinguish him from his son (1621-87), a painter and engraver. His daughter Maria Sybille (1647-1717) and her daughters were painters of insects and flowers; his grandson Jan was a miniature painter.

Merida (mēr's-thā), ancient, *Augusta Emerita*, town in Badajoz, Spain; on the Guadiana; 36 m. E. of Badajoz. During the Roman Empire it was the capital of Lusitania. Among the remains of that time are the superb bridge over the Guadiana, 2,575 ft. long and containing eighty-one arches, and the triumphal arch of Trajan in the middle of the city. Of the magnificent aqueduct from the laguna of Albuera thirty-seven enormous piers are still standing, with ten arches in three tiers built of brick and granite. Pop. (1900) 9,124.

Merida, capital of State of Yucatan, Mexico; on a plain, 22 m. from its port of Progreso on the Gulf of Mexico; was founded by Francisco de Montejo, 1542, on the site of the Maya city of Thó; the latter is still the Maya name of the place. The cathedral, several monasteries, now used for secular purposes, and many dwellings date from the sixteenth century. Merida has faculties of theology, law, medicine, etc., forming a university, and numerous other educational institutions. Its modern commercial activity is largely due to the trade in sisal hemp. Pop. (1900) 43,630.

Meriden, city in New Haven Co., Conn.; about midway between New Haven and Hartford; is widely noted for the extent and variety of its manufactures, which include silver-plated ware, Britannia metal goods, hardware, cutlery, steel pens, glassware, cabinet organs, malleable iron, iron and brass castings, machinery, etc. According to the U. S. census of 1909 there were 120 "factory-system" plants operated on a capital of \$17,675,000, and yielding products valued at \$16,317,000. The city is the seat of the State School for Boys, and has the Curtis Home for Orphan Children and Aged Women, a model high school, and a city hospital. Pop. (1910) 27,265.

Merid'ian, of a place, the intersection of the earth's surface with a plane passing through the place and the earth's axis. It is a N. and S. line. If the plane of the meridian of a place is prolonged to intersect the celestial sphere, the line in which it cuts that sphere is the celestial, or astronomical, meridian of the place. The *magnetic meridian* of a place is the intersection of the earth's surface with a vertical plane passed through the axis of a freely suspended magnetic needle at the place. The angle between this meridian and the true meridian is called the *declination* or *variation* of the needle. See **LONGITUDE**.

Merid'ional Parts, parts of the meridian, as used in Mercator's system, extending from the equator, and computed for all latitudes differing by a minute up to some limit, usually 83°. These parts are tabulated, and are used in this form for projecting maps and charts and for solving problems in Mercator's sailing. See **MERCATOR'S PROJECTION**.

Mérimée (mă-rē-mă'), *Prosper*, 1803-70; French author; b. Paris; held various places in the civil service; became, 1831, inspector of the archæological and historical monuments of France; entered the Academy, 1844; was made Senator, 1853; works include "Historic Monuments," "History of Don Pedro I, King of Castile," the novels or small romances "Colomba" and "Carmen," "La Guzla," lyrical poems, professedly translated from the Spanish.

Mer'ivale, *Charles*, 1808-93; English historian; b. Barton Place, Devonshire; was university preacher at Cambridge, 1839-41; Hulsean lecturer, 1862, and Boyle lecturer, 1864-65; chaplain to the Speaker of the House of Commons, 1863-69; became Dean of Ely, 1869. He wrote "The Fall of the Roman Republic,"

"History of the Romans under the Empire," "Conversion of the Roman Empire," "Conversion of the Northern Nations," etc.

Merivale, Herman, 1806-74; English statesman and author; brother of Charles Merivale; b. Dawlish, Devonshire; was called to the bar, 1832; Prof. of Political Economy at Oxford, 1837-42; Under Secretary for the Colonies, 1848-60; became Perpetual Under Secretary for India; author of "Five Lectures on the Principles of a Legislative Provision for the Poor in Ireland," "Lectures on Colonization and Colonies," "Historical Studies," "Life of Sir Henry Lawrence."

Merle d'Aubigne (mêrl dô-bên-yâ'). See D'AUBIGNE.

Merle. See BLACKBIRD.

Merlin, Ambrosius, ancient Welsh prophet and enchanter, traditionally stated to have lived in the fifth century A.D. His legendary history is given by Geoffrey of Monmouth in his "Historia Brittonum," where he is represented as having sprung from the intercourse of a Welsh princess with a demon, and to have been the adviser of kings Vortigern, Uterpendragon, and Arthur. He figures largely in all the Arthurian poems from Spenser to Tennyson.

Merlin, Caledonius Sylvestris (THE WILD), legendary British seer; said to have lived at Strathclyde in Scotland in the sixth century. His grave is still shown at Drummelzier on the Tweed, where he was killed on returning from an incursion into Northumbria. He seems to have been a copy of his Welsh prototype.

Merlin, little hawk of Europe, *Falco asalon*. It is swift and courageous, as well as docile in confinement, and hence it was once exten-



MERLIN.

sively employed for hawking at small game. It is represented by the pigeon hawk in the U. S.

Mer'maid, imaginary marine being, having the form of a woman to the waist, and end-

ing in the tail of a fish. Mermen, the males of this supposed species, are also described. The probability is that the appearance of the dugong or some other marine animal in places where it was not well known may have given rise to the stories regarding this fabulous being. The sirens, nereids, and water nymphs of poetry are all forms of the same creature.



MERMAID.

Merodach (mêr'ô-dâk), or Bel Merodach, second of the minor Babylonian gods, astronomically identified with the planet Jupiter. The name was at first a mere epithet of the god Bel, and by degrees superseded the proper name. Bel Merodach is represented as the son of Ao and Davke, and the husband of Zirbanit. Babylonian kings were often named after him, as Merodach-baladan and Evil-merodach.

Mérode (mâ-rôd'), François Xavier Marie Frederic Ghislain de, 1820-74; Belgian prelate; b. Brussels. His mother was a niece of Lafayette; and his father, Count Félix de Mérode, took a leading part in the Belgian Revolution of 1830. Xavier entered the Belgian army, 1841; afterwards studied theology in Rome, and was ordained priest, 1850. He was rapidly promoted; was papal Minister of War, 1860-65, and, 1866, became Archbishop of Melitene and private almoner to the pope. He devoted a large portion of his patrimonial wealth to the improvement of the streets and squares of Rome and to archaeological excavations, and still more to founding charitable institutions and schools.

Meroë (mêr'ô-ë), name given by Cambyes to the Ethiopian city Saba in honor of his sister who died there. It was situated on the Nile, between the fifth and sixth cataracts, in Upper Nubia. After the decay of Napata to the N., it became the Ethiopian capital, the chief place of an independent kingdom, in the tenth and ninth centuries B.C. The name was also applied to the ancient kingdom of which Meroë was the capital, and whose kings, "So" and Tirhaka, invaded Egypt. It also survives as the name of a wretched village on the ancient site. The Isle of Meroë is the name of a tract in S. Nubia, having an area of 577,480 sq. m., between the Nile and its tributary, the Atbara.

Me'rom, biblical name (Josh. xi, 5) for Huleh, a lake in N. Palestine; triangular in form, the apex pointing S., about 4 m. long, and its greatest breadth 3½.

Merovingians (mêr'ô-vîn'jî-ânz), name of the first Frankish dynasty in Gaul or France; so called from Meroveus, King of the Ripuarian Franks (448-58). He was succeeded by Childeric I (458-81), whose son Clovis, the conqueror of Gaul and the first Christian monarch of the Franks, left his possessions in 511 to his sons Thierry or Theodoric, Clodomir, Chilbert, and Clotaire. Clotaire, the youngest, reunited the empire of the Franks (558-61). On his death it was again divided by his four sons, Charibert reigning in Paris, Gon-

tran or Guntram in Orleans (to which Burgundy, a new conquest, was attached), Sigebert in Austrasia, and Chilperic in Soissons. Clotaire II, the son of Chilperic and Fredegonda, reunited the whole kingdom. His son Dagobert was the founder of a line of kings known as *fainéants* (do nothings), their mayors of the palace being the real rulers of France. The last of these, Childeric III (742-52), was deposed by Pepin the Short, founder of the Carolingian dynasty.

Mer'rimac, The. See MONITOR.

Merrimac River, stream of New Hampshire and Massachusetts; formed by the union of the Pemigewasset and Winnipiseogee at Franklin, N. H.; flows S. into Massachusetts, where it curves toward the NE., and reaches the ocean in lat. 42° 48' 27" N., lon. 70° 48' 46" W. On its banks are the cities of Concord, Manchester, and Nashua, N. H., and Lowell, Lawrence, Haverhill, and Newburyport, Mass.

Mer'ritt, Wesley, 1836-1910; U. S. army officer; b. New York City; graduated at West Point and entered the cavalry, 1860; commanded the reserve cavalry at Gettysburg and in later operations, and a division under Sheridan in the Richmond campaign, 1864; in battles of Opequan, Cedar Creek, Winchester, Fisher's Hill, Five Forks, and Sailor's Creek; breveted major general U. S. A., 1865; one of the commissioners to arrange the surrender of Lee's army; superintendent of the Military Academy, 1882-87; commanded the army in the Philippines; military adviser to the American peace commissioners in Paris, 1898; major general, 1898; retired, 1900.

Mer'ry del Val, Raphael, 1865- ; cardinal and papal Secretary of State; b. London; son of the Spanish ambassador to Great Britain; educated at Stonyhurst College, England, and the College of Nobles, Rome; held minor diplomatic posts, the last being at Rome, where he was accredited to the Holy See; as papal ablegate visited Canada, 1896, to investigate the troubles caused by the Manitoba school dispute; papal Secretary of State, 1903; mainly responsible for the encyclical denouncing the French separation law and forbidding Catholics to obey it; protested to France against the lack of respect shown to the pope by M. Loubet, the French president, when the latter visited Rome, 1904, thereby causing the withdrawal of the French representative at the Vatican.

Mer'sey, river of England which rises in Derby, flows in nearly a W. direction, expanding at Runcorn into a broad estuary, on the N. side of which is Liverpool; below this joins the Irish Sea. This estuary is from 1 to 3 m. broad, and is about 16 m. long; on its Cheshire side is the entrance to the Manchester Ship Canal, and underneath it is a tunnel connecting Liverpool and Birkenhead by railway. The Mersey, with the estuary, has an entire length of about 70 m., and is navigable to its junction with the Irwell, its principal affluent.

Mersa'na, chief port of S.E. Asia Minor; in the vilayet of Adana. Its roadstead is exposed

and has a shifting bottom. Its exports of carpets, cotton, wool, sesame, linseed, and castor beans are important.

Merson (mār-sōn'), Luc Olivier, 1846- ; French historical painter; b. Paris; awarded the Grand Prix de Rome, 1869; Salon medalist, 1873; Legion of Honor, 1881. His work possesses qualities of a high order. "St. Isidore" is one of his finest works; "Repose in Egypt," the Holy Family resting by night in the desert, exhibited at the Salon of 1879, went to the Coall collection, St. Louis, Mo.

Merthyr Tydvil (mēr'ther tid'vil), parliamentary borough of Wales; on the borders of Brecknock and Glamorgan; on the Taff; 24 m. N. by W. of Cardiff, its port. The industries arise entirely from the collieries and iron works in the vicinity, as Merthyr is the center of the Glamorgan coal fields. Pop. (1901) 69,228.

Mer'ton; Walter de, d. 1277; English prelate; b. Merton, Surrey, or at Basingstoke, Hampshire, early in the thirteenth century; took holy orders; obtained several benefices; appointed Lord Chancellor, 1261; deprived of his office by the barons, 1263; reappointed, 1272, but resigned, 1274, having been appointed Bishop of Rochester. He founded Merton College, Oxford, 1264; gave it a further endowment, 1270, and saw it completed, 1274. Its distinctive feature was that it was a literary, not a sacerdotal, institution, and that the students were prohibited from taking vows. It became the archetype on which most subsequent colleges at Oxford were modeled.

Merv (mērv), ancient *Margiana*, oasis in Transcaspiia, Russian central Asia; 250 m. N. of Herat; area, 2,000 sq. m.; pop. 150,000 to 200,000; formed by the Murghab, and surrounded W., N., and E. by the most arid parts of the Kara-Kum desert, while to the S. it communicates with the valley of the Herirud of Afghanistan. The inhabitants are Turcomans of the Tekke tribe, who add to the productions of their agriculture and manufactures (arms, silverware, superior carpets, felts, coarse cloths, etc.) by pillaging their neighbors. The present town of Merv has sprung up since the extension of the Transcaspiian railway through the oasis.

Méry (mā-rē'), Joseph, 1798-1866; French poet and satirist; b. Aygualades, near Marseilles; settled in Paris, 1824; worked on the *Némésis*, a satirical journal; works include the drama, "The Two Frontiers"; the poem, "Napoleon in Italy"; the romances, "Scenes from Italian Life," "London Nights," and "Héva."

Méryon (mā-ryōn'), Charles, 1821-68; French engraver and etcher; b. Charenton, near Paris; son of a physician; entered the navy and rose to lieutenant; began the study of art formally, 1846; gave up painting because his eye for color was defective; made a specialty of etchings of the buildings of old Paris, the best known of which are "Eaux-Fontes sur Paris"; failed to obtain recognition and adequate means of living, and died insane.

Mescalá (mēs-kā'lā), river of Mexico, rises near Puebla, and flows W. 400 m. to the Pa-

cific between Guerrero and Michoacan. In Puebla it is known successively as the Atoyac and the Rio Pablano, farther on also as the Rio de las Balsas, and at its mouth it is called the Zacatula.

Mesembryanthemum ("midday flower"), genus of succulent plants called fig marigolds, as some species produce an edible fruit resembling a fig. There are about 300 species.



MESEMBRYANTHEMUM.

They are natives of warm, dry countries, the greater number being from S. Africa; the leaves in all are exceedingly succulent and well adapted to resist the long droughts of their native regions.

Mes'entery, double fold of peritoneum which attaches the small intestine to the spinal column, but so loosely as to allow much freedom of motion. The corresponding support of the large intestine is the *mesocolon*, with the *mesorectum*. It contains between its folds blood vessels, nerves, and lymphatics.

Me'sha, King of Moab in the reigns of Ahab, Ahaziah, and Jehoram, tributary to the Kingdom of Israel, to which he annually paid "a hundred thousand lambs (2 Kings iii, 4) and a hundred thousand rams with their wool." On the death of Ahab (i, 1; iii, 4) he revolted, and Jehoram made an alliance with Jehoshaphat, King of Judah, against him. The two kings overran Moab with the exception of one stronghold, which Mesha successfully defended after offering his first-born son as a burnt-offering to his god Chemosh (iii, 27). An inscribed tablet of this king, the Moabite Stone, which commemorates the deliverance hinted at in 2 Kings iii, 27, was discovered, 1868, at Dibon.

Mesh'ed, capital of province of Khorassan, Persia; 185 m. NW. of Herat; contains the mausoleum of Imān Riza, founder of the great Mohammedan sect of the Shiites. This is among the most magnificent buildings of the East, and is visited by many pilgrims. Besides being so-called holy city, Meshed is a great

trade center. Its carpets, shawls, light silks, and sword blades have a high reputation; also earthenware, glass, porcelain. Pop. abt. 60,000.

Mes'mer, Friedrich Anton, 1733-1815; German physician; b. near Constance, Baden; began his famous magnetic cures, 1772; went to Paris, 1778; made an enormous sensation and a great fortune, but lost his reputation there by the unfavorable report made on his method by a royal committee of the greatest French physicians and scientists; practiced for some time in London, though with less success; returned to Germany, and died almost entirely forgotten at Meersburg. Mesmer gave his name to the whole class of phenomena now known as hypnotism.

Mes'merism. See HYPNOTISM.

Mesopota'mia ("the country between the rivers"), name applied since the third century B.C. to the territory inclosed between the Tigris and Euphrates, and 33° 30' and 37° 30' N. lat.; called by the Arabs el Jezireh, "the Island." The region is now part of Asiatic Turkey, constituting the vilayet of Mesopotamia. The N. part is rendered hilly by spurs of the Taurus; all the rest is a low, level plain, consisting mainly of dry steppes. Kurds inhabit the N., but the majority of the inhabitants are Arabs. Area, 143,250 sq. m. Pop. abt. 1,398,200.

Mesozo'a, name introduced by Van Beneden for certain problematical animals, from the fact that he regarded them as occupying a position intermediate between the Protozoa, or single-celled, and the Metazoa, or many-celled animals. The forms included are almost microscopic, and are either threadlike or spindle-shaped. They have neither mouth, nervous system, nor muscles. They live as parasites in cuttlefishes, Echinoderms, and certain worms. They are regarded as degenerate worms. None has been found in America.

Mesozo'ic E'ra, second of the three great divisions of geologic time characterized by known forms of life; was preceded by the Palæozoic era and followed by the Cenozoic; sometimes called the era of reptiles. In the chronologic system of most European geologists it includes the Triassic, Jurassic, and Cretaceous periods; in the system adopted by the U. S. Geologic Survey it includes the Jura-Trias and Cretaceous periods.

Messali'na, Valeria, daughter of Valerius Messalinus Barbatus, wife of Claudius, Emperor of Rome. Her licentious conduct is unparalleled in history. When summoned by the enraged emperor, after some fresh extravagance in the year 48, she attempted to kill herself, but wanted courage, and her enemy Narcissus, who dreaded the result of the interview, caused her to be despatched by a soldier.

Messalina. See CLAUDIUS.

Messa'pia, ancient Greek name of the peninsula forming the SE. extremity of Italy, called by the Romans Calabria, a name applied in modern times to the opposite peninsula. The peninsula was probably first known to the

Greeks as Japygia, afterwards applied by them to all SE. Italy. The inhabitants were of two tribes, the Salentini along the SW. coast near Tarentum, and the Calabri, whom the Greeks called Messapians, along the NE. part.

Messe'nia, or **Messene**, SW. division of the Peloponnesus in ancient Greece, bordering on Elis, Arcadia, Laconia, the Gulf of Messenia (now Coron), and the Ionian Sea. The country was renowned for the mildness of its climate. Among the few towns of note were Pylos, a seaport, Corone (now Coron), Methone (Modon), and the later capital Messene, besides the mountain fortresses of Ithome and Ira. The earliest inhabitants were Leleges and Argives. It was later settled by Æolians. The Messenians were subjected to Sparta after a war of twenty years, 743-723 B.C., of which Aristodemus is the legendary hero. A revolt under the lead of Aristomenes, 685-668, resulted in the emigration of a large part of the inhabitants to Italy and Sicily, and the subjection of the remainder to the condition of helots. They rose in insurrection with the other helots, 464, but were subdued after a ten years' war, and all driven into exile. After the victory at Leuctra, 371, Epaminondas recalled the refugees, and built Messenë as a new capital, which was maintained till the Roman conquest, 146. Pop. (1907) 127,991.

Messia'h (Hebrew *Mashia'h*, "anointed"), in Jewish and Christian history and theology, an epithet applied to anointed kings and high priests, and to the expected deliverer or historical Redeemer. Christos is its Greek equivalent. See CHRIST; INCARNATION.

Messina (mēs-sē'nā), seaport in province of same name, Sicily; on the Strait of Messina. It rises amphitheaterlike from the sea, backed by the rocky extremity of the Siculo-Calabrian Apennines. The harbor, the largest and safest of Italy, is deep, well furnished with quays, and defended by a fort and citadel. It has received annually over 4,000 vessels of 1,130,000 tons burden, the imports being wheat, cotton, and woolen goods, hardware, etc.; the exports, fruit, wine, oil, essences, and silks. The university was founded 1549. There are many noteworthy churches, and the old cathedral is one of the most interesting monuments of the city. The place, originally called Zancle or Dancle, was colonized by Chalcidians, 729 B.C., and by Miletans and Samians, 494. It came into the power of Anaxilas, tyrant of Rhegium, who renamed it Messene (Doric Mesana), after his mother country, Messenia. It suffered severely during the Punic and the Roman civil wars, also from the Goths and the Saracens, the latter being expelled by the Normans in the eleventh century. In 1282, 12,000 Frenchmen perished here in the Sicilian Vespers. In 1848 Messina threw off the Bourbon yoke, but was reduced to submission after an obstinate and destructive resistance. In 1860 it was freed by the forces of Garibaldi. On December 28, 1908, Messina and much of the surrounding country was destroyed by earthquake and tidal wave. Loss of life in Messina was estimated at 50,000 to 75,000. Pop. (1907) 149,780.

Messina, Strait of, narrow channel of water connecting the Ionian and the Tyrrhene seas, and dividing Sicily from Calabria; length, 26 m.; greatest width, 12 m.; least, 2 m. The tide is most irregular in this strait, the E. current being vastly stronger than the W., and the flood and ebb succeed each other with great rapidity. For a curious phenomenon witnessed here, see FATA MORGANA.

Mestizo (mēs-tē'zō), in Spanish America, a half-breed, the offspring of a white father and an Indian mother. The white characters usually predominate. The offspring of an Indian father and a quadroon mother (three fourths white, one fourth negro, the latter by the female side) or a quinteroon mother produces what is called a brown mestizo. A mestizoclaro is the offspring of an Indian father and a mestizo mother.

Meta (mā'tā), river of Colombia and Venezuela, rising in the E. Cordillera and flowing ENE. to the Orinoco; length about 750 m., of which about 180 m. are in Venezuelan territory. The Meta is properly formed by the confluence of the Humades, Negro, and Upia, almost directly E. of Bogota. It is navigable for steamboats to Cubuyaro, over 400 m.

Met'allurgy, science which treats primarily of the separation of the metals contained in their natural combinations or associations, known as ores, and secondarily of the manipulation of the metals and the production of metallic compounds or alloys. The modes of occurrence of metals in nature are: 1, Native, either pure or alloyed; 2, sulphides and combinations of sulphides and arsenides; 3, oxides and combinations of oxides with silicic and carbonic acids. More rarely arsenides, chlorides, tellurides, etc., are met with, and also compounds of oxides with other acids than those mentioned, as phosphoric, sulphuric, etc. The metallurgical treatment of an ore depends, first, on the physical characters of the minerals and accompanying rocks, and, secondly, on their chemical composition. It may therefore be divided into mechanical and chemical: the former dealing with the separation of native metals or metallic combinations from enclosing rock and gangue, and with the separation of associated minerals from each other according to their relative specific gravities; and the latter with the resolution of the chemical combinations of the metals with the non-metallic elements and with each other.

The oreless rock mixed with the metal-bearing mineral is called the gangue. Two general kinds of gangue are distinguished: First, earthy gangue, which is either acid, from a preponderance of silica, or basic, when lime, magnesia, alumina, and iron most frequently occur. In this case two methods of removing the associated rock may be used. One is mechanical, the ore being crushed fine and passed through machines which cause a separation of the heavy ore from the lighter gangue by virtue of their different specific gravities; or by subjecting the crushed ore to some uniform force which affects the two minerals differently. The second kind of gangue is one that consists of a metal-bearing mineral, with

which is associated the mineral containing the object of the metallurgist's labors. The general character of the processes by which a metal is extracted from its ores is not governed by the metal itself, but by the negative element with which it is combined. The metal may decide the adoption of a particular class of operations or apparatus, but the native metals may all be obtained by mechanical dressing or by simple fusion; the sulphides must all be melted with some substance that will combine with the sulphur and leave the metal free, or else they must be roasted and then treated like oxides; and the oxides of the useful metals are all reducible to metal by heating them with carbon or other reducing agents. Three modes of producing these reactions are employed—the dry, the wet, and electrolysis. In the first the fluidity necessary for the free action of the substances employed is obtained by heat, in the second by solution in a liquid, and in the third by electric current. Two of these modes are frequently combined in the treatment of ore. See FUSIBLE METALS; METALS; MINERALOGY.

Metals, elementary substances characterized by their peculiar and generally high luster; by very great opacity, and, with few exceptions, by their high specific gravity. There are forty-nine of these elements, tellurium, sometimes reckoned as the fiftieth, being generally classed with the metalloids. The color of the metals is generally white, with a grayish, bluish, or pinkish tint; copper and gold are the only exceptions. Some of them, as gold and platinum, are very dense, and most of them considerably so. With the exception of arsenic, they may all be fused, the temperature required varying from 100° F. to the highest heat of the oxyhydrogen blowpipe. Some of the metals may be volatilized. Mercury, the only liquid metal, is solidified at -39° or -40° F. Arsenic when heated passes directly into vapor without fusion. Some metals, as gold, silver and copper, are extremely malleable and ductile; others, as antimony, arsenic, and bismuth, are decidedly brittle. Some assume a plastic condition before complete fusion, notably iron and platinum; on this property depends the operation of welding. The strength of the metals is very dissimilar, iron in the form of wire being about twenty-six times as tenacious as lead. They are all conductors of heat and electricity, although differing widely in this respect. The metals, so far as known, comprise all the elements except fourteen, viz., hydrogen, chlorine, oxygen, nitrogen, carbon, bromine, iodine, fluorine, sulphur, selenium, tellurium, phosphorus, silicon, and boron.

The classification of the metals according to their equivalence or combining power is the most accurate for the general purposes of modern chemistry. This method of classification assumes the atomic weight of hydrogen as the unit for the relative combining weights of the elements, which are then placed in groups whose members have equivalent combining proportions, and also possess certain properties in common.

1. **Monad Metals**.—The *alkali metals*, potas-

sium, sodium, lithium, cesium, and rubidium, which form only one chloride each. Silver, although differing widely from the alkali metals in general, is a monad, and yields an alum closely related to potash alum.

2. **Dyad Metals**.—Barium, strontium, and calcium, whose oxides are called the *alkaline earths*, form a group together. Glucinum, yttrium, erbium, lanthanum, and didymium, all rare metals, whose oxides are called *earths*, form a second group. Zinc and cadmium, with magnesium, which is analogous in many of its compounds to zinc, although it was formerly reckoned among the alkaline earths, form a third group. Mercury and copper constitute a fourth group, and form each two chlorides.

3. **Triad Metals**.—Indium, forming only a trichloride, and thallium and gold, forming each a mono- and a trichloride, belong here.

4. **Tetrad Metals**.—Platinum, palladium, iridium, rhodium, ruthenium, and osmium are classed together, and all form tetrachlorides, as well as dichlorides, excepting rhodium, which forms a dichloride and a trichloride, but is retained here from analogy. Tin and titanium form a second group of tetrads. Lead is considered quadrivalent, because it yields a plumbo-tetrathide with the hydrocarbon radical ethyl. Zirconium and thorium form tetrachlorides. Iron, aluminum, manganese, cobalt, nickel, and cerium are also considered as tetrads, although their proper position is on some accounts doubtful.

5. **Pentad Metals**.—Arsenic and antimony form trioxides and pentoxides, and bismuth is grouped with them from its analogy to antimony. Vanadium is regarded as a pentad on account of its analogy to phosphorus in some of its combinations. Tantalum and niobium have been shown to form pentachlorides.

6. **Hexad Metals**.—Chromium forms a hexafluoride, and uranium is reckoned as a hexad from compounds similar to those of chromium. Tungsten forms a hexachloride, and molybdenum, being analogous to it, is considered hexadic.

Metalwork, the manipulation and treatment of metals and the making of metal objects of any kind, for use or ornament; also the objects so made. Ordinarily the term is not used for matters of pure utility—i.e., machinery, barbed-wire fences, stopcocks, etc.—but is applied rather to things that are more or less ornamental.

Metals are given the desired forms by processes of casting, hammering, stamping, filing, rolling, and drawing. The forms so produced are further modified by chasing and engraving. The colors of metals are changed by alloyage, plating, and gilding, by exposure to washes and "pickles," and by the formation of oxides and sulphides on the surface. Ironwork produced by hammering or forging iron when it is red hot and welding it together is called wrought iron. Nearly all the artistic work in iron in all ages and in all parts of the world has been wrought iron. Repoussé work is produced by beating up patterns in relief in thin plates of metal, nearly all the relief ornaments in old silver plate being of this character. It is usually done in gold, silver, copper, and

bronze, but both lead and steel have been treated in this way. Repoussé work has been both chased and engraved.

Iron used in cast work is not pure, but has much carbon combined with it. It is also more brittle and harder than wrought iron, does not give a good casting, and is too hard to be tooled. It is, therefore, not recognized as a medium for works of art. The most important use of casting in art is in the case of bronze, which gives a sharp and delicate casting and allows of great refinement of finishing work upon the surface, so that it can be brought to a full realization of the artist's conception. The most important kind of stamped work is that of medals and coins struck with a die. Apart from this, stamps are used chiefly in silverware and the finer vessels of pewter. Filing and chiseling, rolling and drawing are only modifications of formative processes. See FUSIBLE METALS; METALLURGY; MINERALOGY.

Metamerism, in zoölogy, that condition exhibited by various types, like Annelids, Arthropods, and Vertebrates, in which the body can be reduced to a series of similar parts. Thus in an earthworm the body is composed of a series of essentially similar segments arranged one after the other, each segment containing portions of the nervous, excretory, digestive, muscular, and circulatory systems.

Metamorphism, term extensively employed in geology to indicate all those changes in rocks whereby they are rendered harder and more crystalline than in their original condition. It is thus contrasted with *weathering* and *decomposition*, which cover those changes tending to make rocks less crystalline and more soluble. The two contending cycles of rock history, *decomposition* under atmospheric conditions, and *recomposition* under high temperature and pressure, have long been recognized. At the earth's surface crystalline masses become hydrated or combine with carbon dioxide, thereby disintegrating into soil; the débris thus formed is spread out in sedimentary deposits, which, when deeply buried, become recrystallized into hard and resistant rocks. Metamorphic rocks occupy an intermediate position between those of igneous and those of sedimentary origin; they owe their component minerals and structures, in great part at least, to the recrystallization of preëxisting rocks without fusion. They include most of the crystalline schists, which are in part igneous and in part of sedimentary origin, although a still larger number are so profusely altered as to leave their original character in doubt.

The faulting, folding, and shearing of great rock masses has generated heat, stimulated circulation, and developed new minerals and structures. Thus new rocks are developed from old ones, and the completeness of the change is, in the main, proportionate to the intensity of the earth's movement. This is *dynamical* or *dislocation* metamorphism. The three most active and necessary agencies in producing the changes called metamorphic are (1) heat; (2) moisture, or some other mineralizing agent; (3) pressure. The presence of a thick mass of overlying material prevents the

free escape of heat and volatile substances, and thus gives them their maximum efficiency.

Metamorphosis, in zoölogy, those changes exhibited by various animals in their growth from the egg to the adult condition in which they pass through forms apparently very dissimilar. Possibly the most familiar example is that afforded by the butterfly, where the caterpillar, the first stage, becomes transformed into the chrysalis, and this, in turn, into the winged form. Metamorphoses are common in all groups of animals except the vertebrates.

Metaphor, figure of speech in which a resemblance that one object or idea bears to another is stated without the words of comparison used in a simile. A metaphor is, in fact, an abbreviated simile. "Ingratitude, thou marble-hearted fiend!" is a metaphor which becomes a simile when expanded into "Ingratitude, thou art like a fiend, with a heart like marble." In a metaphor the words of comparison are understood, and the concise construction adds force to the figure. When the resemblance between the things compared is not clear, it is safe to use the simile.

Metaphysics. See PHILOSOPHY; PSYCHOLOGY.

Metar'gon, gaseous element obtained from the atmosphere by Prof. William Ramsay and Dr. Morris W. Travers, of London, England. In the liquefaction of large volumes of argon, using liquid air as the cooling agent, it was found that a white solid appeared on the sides of the bulb and in the liquid. The gas obtained by this method, after the liquid had boiled away, gave a spectrum which was entirely different from that of argon, though resembling it in general character. The density of the gas was found to be almost identical with that of argon, being 19.87, and it is monatomic.

Metastasio (mā-tās-tā'zē-ō), Pietro, 1698-1782; Italian poet; b. Rome; was adopted and educated by the juriconsult and critic Gravina, who Grecized his name and left him a considerable sum of money; at the age of fourteen wrote a tragedy, "Giustino"; soon spent his inheritance, but found a living in an advocate's office in Naples; wrote anonymously the tragedy "Endimion," then the "Gardens of the Hesperides" ("Orti Hesperidi"), 1722. In 1730 he settled in Vienna, having, through the influence of the Countess Althann, obtained the place of Cæsarian poet at the Court of Austria. His lyrical dramas, or melodramas in the accurate sense of the term, include "Galatea," "Didone Abandonata," "Artaserse," "Semiramide," "Demetrio," "Demofonte," "La Clemenza di Tito," and "Attilio Regolo." Mozart, Gluck, and other composers furnished the music for them. He also wrote lyrics, sonnets, idylls, etc.

Metastasis, in pathology, the sudden removal of a disease to a distant part, as when the disease called mumps is transferred from the parotid gland to the ovaries or to the testes. There are also metastatic abscesses, dependent on the transference of bacteria

from a first place of suppuration to distant parts by the blood. Tumors give rise to secondary growths at a distance in similar manner, a small part of the original tumor being carried to the distant part where it grows.

Metayer', name applied to the peasants of Continental Europe, and especially those of France and Italy, that farm their land on shares. This form of tenure was common all through the Middle Ages and to the end of the eighteenth century, but is falling into disuse. The landlord furnished the land, the metayer furnished the labor; the landlord usually received half the produce in France, two-thirds in Italy.

Metazo'a, term given, in contrast to Protozoa, to the great majority of the animals, which differ from the Protozoa in the fact that they are composed of many cells, and these cells are further differentiated into tissues and organs, while in the Protozoa each cell performs all the functions of life.

Metellus, Quintus Cæcilius (called **MACEDONICUS**), d. 115 B.C.; Roman military officer; member of the plebeian gens Cæcilia; defeated the Macedonians, 148 B.C., and the Achæans, 146; with Q. Pompeius was censor, 131 (they were the first plebeians to hold this office), and proposed that all citizens should be required to marry. His name became proverbial as an example of human happiness.

Metellus, Quintus Cæcilius (called **NUMIDICUS**), Roman military officer; was chosen consul for 109 B.C., and obtained Numidia as his province; fought successfully against Jugurtha, king of that country, 108, but was superseded by Marius, at that time his legate; became censor, 102; about 100 was banished, partly through the influence of Marius, but was recalled, 99.

Metellus, Quintus Cæcilius (called **CELER**), d. 59 B.C.; Roman statesman; was prætor, 63, when Cicero was consul, and contributed much to the suppression of the conspiracy of Cataline.

Metempsychosis (mê-têmp-si-kô'sis), supposed transmigration of the soul from one body to another. It is a feature in Brahmanism and Buddhism, which represent the migration after death into the body of a higher or lower animal as a reward of virtue or penalty for vice. The soul may even deteriorate into the vegetable or mineral world. According to Herodotus, the Egyptians were the first to entertain the doctrine. The later Pythagoreans maintained it. Plato adopts and treats of it in his "Phædo." The idea appears in the speculations of the Neoplatonists and in the cabala of the Jews. To the pure theism of the early Jews and Arabs, or of the Shemitic race, who simply held that God directly made and willed all things, this idea was utterly opposed. Consequently, the Old Testament contains no trace of the transmigration of souls. Gnostics and Manichæans welcomed the doctrine, and the more speculative or mystical of the Church Fathers found in it a ready explanation of the fall of man and the doctrine of evil spirits.

All are "dreeing their weird," or undergoing penance for sins. This considerable step toward reconciling the existence of suffering with that of a merciful God was set forth by Porphyry and Origen, and passed from the East, with all the strange heresies of "illumination," in all probability, through such institutions as the Cairene House of Light and the Knights Templars, into the doctrines of the obscure sects of the Middle Ages in Europe. The Taborites, an extreme branch of the Hussites, are said to have believed in transmigration. The Druids taught it, and of late years it has become familiar through the writings of Mme. Blavatsky and the members of the Theosophic Society. See **TRANSMIGRATION OF SOULS**.

Me'teor, term used to denote many different objects and phenomena, generally of short duration, that have their place in the atmosphere. Thus there are *aërial meteors*, as winds, tornadoes, etc.; *aqueous meteors*, as fogs, rain, snow, hail, etc.; *luminous meteors*, or those due to the action on light of elements in the air, as rainbows, halos, parhelia, mirages, etc.; *electrical meteors*, as lightnings, auroras, etc.; and *igneous meteors*, as shooting or falling stars, star showers, bolides or fireballs, aërolites or meteorites, etc. In present usage the term *meteor* is generally limited to the last group, or to the igneous meteors. The shooting stars are of all degrees of brightness. Some are so faint that one looking at them cannot be certain that he sees anything, and some are visible only in a telescope. Others may be brighter than the planets, or even than the moon. These are called *bolides* or *fireballs*, or by older writers *flying dragons*. The larger fireballs often explode into fragments, the parts chasing one another across the sky or scattering in different directions. In some cases terrific explosions, as of distant and numerous cannon, are heard over all the region a few minutes after the disappearance of the body. These are called *detonating meteors*. At times from these detonating meteors come down stony fragments, scattering themselves over a region miles in extent, and usually striking the ground with enough force to bury themselves in soft earth 1 or 2 ft. These fragments are called *aërolites* or *meteorites*. Especially brilliant meteoric showers are seen in August and November—the November showers being most brilliant every thirty-three years. See **ASTEROID**; **COMET**; **PLANET**; **STAR**.

Me'teorite, **Meteor'olite**, or **A'ërolite**, terms used to denote a solid body that has fallen from the heavens. They are not to be confounded with those small luminous bodies that flash across the sky every bright night, visiting us in large numbers at stated periods, and called shooting stars. A genuine meteorite may flash across the sky, become visible, and yet pass on without sending to the earth any evidence of its true character; but very frequently it falls to the earth. These bodies have been observed to fall in all ages of the world; and doubtless the earliest account we have of any one of them is Joshua x, 11. The celebrated black stone, Hajar el Aswad, that forms an object of adoration of the pilgrims

to the Kaaba at Mecca, is doubtless one of these bodies; and some think that the image which fell down from Jupiter (Acts xix, 35), and was worshiped by the Ephesians, was also an aërolite.

Meteorites contain no elements, so far as is known, which have not been found on the earth, but these elements are compounded differently from that of any terrestrial minerals. Iron is always present, usually in metallic form and combined with nickel. The stones from different meteors differ much in their structure, though they may be grouped in a few well-marked classes. In general, the meteorites resemble the igneous more than the other rocks of the earth's crust. The iron masses have a crystalline structure, which is revealed by polishing a surface and etching it with acid. It is now fully understood that meteorites form a few specimens of countless small bodies or fragments, invisible in the most powerful telescopes, which are moving like planets or comets in eccentric orbits around the sun. The American Museum of Natural History, New York, contains a meteorite brought by Peary from Greenland, 1897, one of three which he discovered, 1894, one weighing ninety tons, the largest known.

Meteorology, science which treats of the atmosphere. It falls naturally into two branches—meteorology proper and climatology. Meteorology proper treats of the weather and its causes, and of the physical laws involved, including the instruments by which the phenomena are observed. Ancient meteorology included everything supposed to be aërial, embracing some things now known to be astronomical, as comets and meteors. As it lacked the means of accurate observation, it came to rely on pseudo-observations, and by the Middle Ages had become thoroughly astrological. A new and better era was begun by the invention of the thermometer (before 1597) and barometer (1643). Two hundred years were spent in developing these instruments and inventing new ones, in gathering the enormous harvest of facts rendered possible by them, and in drawing the plain deductions from these facts, when a new era was initiated by the use of the synchronous weather map.

The weather map is a chart on which are graphically represented meteorological data taken simultaneously over the entire area it represents. To make the map useful for forecasting, the data must be collected and transferred to the chart with the least possible delay—within two or three hours of taking the observations, if possible, and within four at the outside. The immediate collection of the data could not be put into operation until the successful trial, 1835, of the electric telegraph and its extension to a considerable number of widely separated places, 1847. In 1856 Prof. Joseph Henry began the use of the first immediate weather map. It was a wall map with movable symbols, posted in the Smithsonian Institution. From the map Prof. Henry deduced certain conclusions concerning the weather, which he sent to Congress. In 1857 Le Verner, in France, began the publication of an international bulletin (a statement of

current meteorological data, but not reduced to chart form), and from these he began predictions for the ports, 1860. On September 16, 1863, he printed the weather map for that day and distributed it to his correspondents. This was the first current weather map published, and the series has been continued since without interruption. It gives daily the air pressure and winds for central and W. Europe.

The official series of weather maps in the U. S. began with tri-daily maps, November 1, 1870. They were in manuscript, and were made both in Washington and Chicago. They were multiplied by a manifold process, and were first printed May 2, 1871, at Washington. The next series of official weather maps was that of the British Meteorological Office, which first appeared in printed form in the bulletin for March 23, 1872. In what follows, reference is always made to the Washington map unless otherwise specified. The maps issued at other U. S. stations differ in some details from the Washington map, and the maps of the other national services, although occupied with the same meteorological elements and serving the same purposes, differ in many details.

The observations are taken at 8 A.M. and 8 P.M., in 75th meridian time. This is what is called Eastern time, and is closely the local time of Philadelphia and nearly that of Washington. It is about seven o'clock local at Chicago, St. Louis, and New Orleans; about six o'clock for Helena, Denver, Santa Fé, and El Paso, and about five o'clock for San Diego, Los Angeles, San Francisco, and Portland. The observations are taken as nearly simultaneously, and as nearly in the same way, with as similar instruments as possible. They are collected at Washington, reduced to maps, the forecasts made, and the maps published within about three hours from the time of observation. The pressures of the atmosphere as shown by the barometer are reduced to sea level before they are entered on the map.

Forecasts for short periods ahead (thirty-six hours generally in the U. S.) are made by nearly all the official weather services by means of the weather map. The general principles on which such forecasts are made may be stated as follows: (1) Lows or cyclones (i.e., areas of lowest pressures) appearing in view to the W. of the meridian of Lake Huron generally direct their course across the Great Lakes; those appearing in view to the E. of this meridian usually pass up N. in a path parallel to the Atlantic coast. All usually leave the vicinity of the U. S. on the latitude of New England or the provinces. (2) Highs or anticyclones (culminations of highest pressures) usually take a more erratic course, with more varying velocity. They usually leave the U. S. on the latitude of the middle Atlantic coast. (3) Lows are more intense, better defined, and run on more S. courses in the cold than in the hot season. In July and August they are especially weak, ill defined, and erratic. The highs are more inclined to become stationary in summer than in winter.

(4) The lows from the W. Indies are the most violent. Next to these the most violent are from the high NW. Those from the W.,

SW., and Gulf are generally gentle, and the last usually afford abundant precipitation.

(5) Severe local storms generally occur to the S. of a very moist and unseasonably warm low, especially if the latter extends a trough of low pressure to the southward.

Many local signs, crystallized in the form of popular weather proverbs, are of use in predictions. This is especially true of the sunset signs, as they indicate the character of W. or approaching weather. The verification of predictions is difficult. With the best means available, the forecasts of the Weather Bureau give a verification of 85 or 90 per cent. The precipitation is especially important in public estimation, but the exact time and place of its occurrence are especially hard to forecast. Verified by the same methods, the popular paradoxes in weather forecasts get only about 50 per cent, but a generous public forgets their failures and remembers their successes. See CLIMATE; WEATHER.

Me'ter, the measure of rhythm; adaptation of speech to measurement by rhythmical units; the rhythmical arrangement of syllables or words, depending upon the number, quantity, and accent of syllables, and their division into feet; the smallest recurring combination of accented and unaccented syllables. Particular results of the process are called *meters*. Meters are distinguished by the kind of feet and the number of feet in a line. The principal kinds of feet which occur in English verse are Iambus, consisting of an unaccented followed by an accented syllable; trochee, an accented followed by an unaccented syllable; dactyl, an accented followed by two unaccented syllables; and anapest, two unaccented followed by one accented syllable. According to the number of feet in a line the meter of that line is distinguished as dimeter, a line consisting of two feet; hexameter, six feet, etc. Thus a line made up of six iambic feet is called iambic hexameter, also known as the Alexandrine measure; a line of five iambic feet is called iambic pentameter, or heroic measure; a line of three trochaic feet is known as trochaic trimeter, etc. A quatrain of four iambic tetrameters is called long meter; a quatrain of four iambic trimeters with an additional foot in the third line is called short meter; common meter or ballad meter consists of a quatrain of four iambic tetrameters alternating with three. The following are examples of the different kinds of feet:

Trochee (—v); "Tall and stately in the valley."

Iambus (v—); "I blame you not for praising Cæsar so."

Dactyl (—vv); "Entered with serious mien and ascended the steps of the altar."

Anapest (vv—); "Macedonia sends forth her invincible race."

Meth'odism, form of church life and polity which originated in England during the eighteenth century. In 1729 John Wesley, with his brother Charles and a few other associates at Oxford, organized a meeting for their mutual moral improvement. They were soon joined

by others, till at the end of six years they numbered fourteen or fifteen. The term Methodists was applied to them on account of their methodical mode of life and work. In the early part of 1739 Whitefield set the first example of open-air preaching at Kingswood, near Bristol. A few simple rules were proposed by the Wesleys, which, with slight exceptions, are still recognized as the General Rules by all branches of the Methodist Church. The articles which Wesley prepared for the Methodist Church in America were taken substantially from the Thirty-nine Articles of the Church of England. Methodism holds that the salvation or nonsalvation of each human being depends solely on his own free action; it is Arminian in distinction from Calvinistic. It emphasizes the doctrine of assurance, i.e., that the Holy Spirit bears witness of pardon and acceptance to the justified sinner. It also makes prominent the doctrine of Christian perfection, or perfect love. The first assembly that took the name of "conference" was held in the Foundery, London, June 25, 1744, and thereafter annually. Methodism holds to no inspired or divinely imposed church polity. In Great Britain it recognizes but one order of clergy, while in America it has provided two.

Wesleyan Methodists.—The original body of Methodists in Great Britain are called Wesleyans or Wesleyan Methodists. Near the close of his life John Wesley drafted the so-called "Deed of Declaration," a plan for the perpetuity of the societies. In this instrument 100 preachers named were declared to be the legal conference, and their character and powers were clearly defined. The provisions of this deed have remained substantially the same to the present time. These members are technically called "The Legal Hundred." By the "Deed of Declaration" the supreme ecclesiastical government is vested exclusively in the hands of the clergy. The ministry is itinerant, preachers being appointed to a church for a single year, and eligible to continue in one circuit not more than three consecutive years. The branch known as *Calvinistic Methodists* arose from a diversity of view between Wesley and Whitefield on doctrinal points, the former advocating the Arminian theology and the latter the Calvinistic. *The Methodist New Connection* originated in 1707. Alexander Kilham, an ordained traveling preacher, made charges against the ministers by whom the body was governed. These charges were judged by the conference of 1796 to be slanderous, and after trial Kilham was expelled. He drew after him about 5,000 members. *The Primitive Methodists* originated, 1810, in consequence of a controversy about the propriety of holding camp meetings. *The Bible Christians* were organized, 1815, by William O'Bryan, a Wesleyan Methodist local preacher, who separated himself from that body. The lesser secessions from the Wesleyan Church are chiefly the Band-Room Methodists, who originated in Manchester, 1806; the Primitive Methodists of Ireland, 1816; the Protestant Methodists, 1828; the Wesleyan Methodist Association, 1835; and the Reformed Methodists, 1849. The last three were merged under the name of the *United*

Methodist Free Church, 1857, and in 1907 the Methodist New Connection, the Bible Christians, and the United Methodist Free Church united under the name of the *United Methodist Church*.

METHODISM IN THE U. S.—*The Methodist Episcopal Church* is the original and largest body of Methodists in the U. S. In 1768 the first chapel was dedicated in John Street, New York; and, 1770, the first Methodist Church in Philadelphia was erected. The first American conference was held 1773, and consisted of ten preachers, all of European birth. At the General Conference of 1844 the case of James O. Andrew, a bishop of the Church, who had come into possession of slaves subsequently to his election, came before the Conference. Arrangements were made for a peaceful separation and an equitable division of property. A convention of the slaveholding conferences met at Louisville, Ky., May 1, 1845, and declared the conferences there represented to be a distinct connection under the name of the *Methodist Episcopal Church, South*. This Church, in economy and doctrine, is very similar to the Methodist Episcopal Church. *Methodist Protestant Church* was organized by former members of the Methodist Episcopal Church, 1830, primarily for the alleged reason that its government secured to the itinerant ministers the unlimited exercise of the legislative, executive, and judicial powers of the Church, to the exclusion of all other classes of ministers, and of all the people. *The Wesleyan Methodist Connection of America* was organized in Utica, N. Y., May 31, 1843. In doctrine and religious usages this body is strictly Methodist. Opposition to slavery was a principal cause of its organization. In 1816 a general convention of colored Methodists organized a separate Church, "in order to secure their privileges and promote union among themselves." In

1819 a secession from this Church was organized, under the title of the African Methodist Episcopal Zion Church. The Colored Methodist Episcopal Church in America was organized, 1870, from members of the Methodist Episcopal Church, South. Other Methodist bodies are the Evangelical Association, organized 1800, largely German; the United Brethren in Christ, also mostly German; and the Free Methodist Church, organized 1860.

Methyl Alcohol, or **Wood Naphtha**, liquid found associated with acetic acid in the watery product from the distillation of wood; it may also be formed (1) by treating methyl chloride with potassic hydrate; (2) by distilling oil of wintergreen, which is chiefly methyl salicylate, with potassic hydrate. Methyl alcohol is a colorless, mobile liquid, having a purely spirituous odor, like that of common alcohol; sp. gr. = 0.8142 at 0° C.; boils at 66°-66.5°; burns with a pale flame, and is used as a substitute for alcohol in spirit lamps. It mixes with water, alcohol, and ether; dissolves fixed and volatile oils and most resins; unites directly with some substances, forming compounds like the alcoholates, in which it takes the place of water of crystallization; thus with calcic chloride it forms $\text{CaCl}_2 \cdot 2\text{CH}_3\text{O}$. By oxidation it is converted into formic acid, $\text{CH}_3\text{O} + \text{O} = \text{HCHO} + \text{H}_2\text{O}$. Calcic hypochlorite (bleaching powder) converts it into chloroform.

Met'ics, foreigners who resided in Athens. In 309 B.C. they numbered 10,000. They had to choose a protector from among the Athenian citizens to represent them in all official acts. In return for this protection the men paid a capitation tax of 12 drachmæ (about \$2.40), while widows paid 6 drachmæ. Neglect to pay this tax was punished with sale into slavery, as was also the illegal assumption of the active rights of citizenship. They might not marry free-born Athenian women, nor own real estate, but still they had to pay the extraordinary war taxes. In solemn processions they acted as bearers of parasols and vases. In return for special services to the state they might be advanced to the position of *Isoteleis*, which freed them from the capitation tax and from the necessity of having patron, and put them on an equal footing with the free-born citizens as far as regarded the owning of real estate and the performance of liturgies, but did not confer on them the right to vote.

Me'tis, daughter of Oceanus and Tethys. She was the personification of wisdom, and was the first wife of Zeus, who swallowed her because of a prophecy that her child would dethrone its father. In this way it came about that Athene was born from the head of Zeus himself, and Metis ceased to be dangerous to him.

Meton'ic Cycle. See LUNAR CYCLE.

Metonymy, figure of speech by which the name of an idea or thing is substituted for another which bears a certain relation to it. Thus the effect may be substituted for the cause, as when *gray hair* stands for old age;

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METHODISTS.	Minist- ters.	Churches.	Communi- cants.
Methodist Episcopal.....	17,861	27,965	3,036,667
Union American M.E.....	138	255	18,500
African Methodist Epis- copal.....	6,070	6,815	850,000
African Union Meth. Protestant.....	200	125	4,000
African Methodist Epis- copal Zion.....	3,912	3,241	578,310
Methodist Protestant.....	1,551	2,242	183,894
Wesleyan Methodist.....	524	598	19,064
Methodist Episcopal, South.....	6,978	15,406	1,673,892
Congregational Method- ist.....	415	425	24,000
Congregational Meth. (Colored).....	5	5	319
New Congregational Methodist.....	238	417	4,022
Zion Union Apostolic.....	30	32	2,346
Colored Methodist Episcopal.....	2,673	2,619	219,739
Primitive.....	72	104	7,013
Free Methodist.....	1,126	1,117	31,435
Independent Methodist...	8	15	2,589
Evangelist Missionary...	92	47	5,014
Total Methodists....	41,893	61,518	6,660,784

MÈTRE

or a part for a whole, as the *keel* for the whole ship.

Mètre, or **Me'ter**, the linear base of the metric system of weights, measures, and mon-
eys. Theoretically, it is the ~~radius~~ part
of the quadrant of a terrestrial meridian;
actually, it is the length of a bar of platinum
designed to represent that dimension (3.280899
ft. = 39.37079 in.), now deposited in the Pal-
ace of the Archives of France in Paris. See
METRIC SYSTEM.

Met'ric Sys'tem, system of weights and meas-
ures designed to remove the confusion arising
out of the excessive diversity of weights and
measures prevailing in the world, by substitut-
ing in place of the arbitrary and inconsistent
systems actually in use a single one constructed
on scientific principles and resting on a natural
and invariable standard. The units of the
metric system are five, *viz.*:

1. The meter (the unit of length) = 3.280899
ft. = 39.37079 in.

2. The are (the unit of surface) = the
square of the dekameter = 119.60332 sq. yds.

3. The liter (the unit of capacity) = the
cube of one tenth of a meter = 0.26418635 gal.
= 1.0567454 qts. = 2.1134908 pts.

4. The stère (the unit of solidity) = one
cubic meter = 35.336636 cubic ft. = 1.308764
cubic yds. This unit has fallen into general
disuse.

5. The gram (the unit of weight) =
15.43234874 grains troy.

Each unit has its decimal multiples and sub-
multiples; that is, weights and measures ten
times larger or ten times smaller than the unit
of the denomination preceding. These multi-
ples and submultiples are indicated by prefixes
placed before the names of the several funda-
mental units. The prefixes denoting multiples
are derived from the Greek language, and are
deka, ten; *hecto*, hundred; *kilo*, thousand; and
myria, ten thousand. Those denoting submul-
tiples are from the Latin, and are *deci*, tenth;
centi, hundredth; and *milli*, thousandth. The
unit of itinerary measure is the kilometer,
which is equal to 0.62138 m. The unit of
land measure is the hectare, equal to 2.47114
acres. The unit of commercial weight is the
kilogram, equal to 2.20462125 lb. avoirdupois.
The metric system has been adopted by forty-
three governments, including the most impor-
tant nations of Europe, except Denmark, nearly
all the countries of Central and S. America,
Mexico, the W. Indies, Japan, Java, and China,
except in the interior. Morocco, Siam, Persia,
and the African races have not adopted it. In
the U. S. and Great Britain the use of the
system is permitted by law, but not com-
pulsory.

Metric Tables.—

LINEAR MEASURE

10 millimeters	= 1 centimeter
10 centimeters	= 1 decimeter
10 decimeters	= 1 meter
10 meters	= 1 dekameter
10 dekameters	= 1 hektometer
10 hektometers	= 1 kilometer

METRIC TABLES

TABLE OF EQUIVALENTS

1 yard	= .91 meters
1 mile	= 1.61 kilometers
1 meter	= 39.37 inches
1 kilometer	= .62 miles

SQUARE MEASURE

100 square millimeters	= 1 sq. centimeter
100 square centimeters	= 1 sq. decimeter
100 square decimeters	= 1 sq. meter
100 square meters	= 1 sq. dekameter
100 square dekameters	= 1 sq. hektometer
100 square hektometers	= 1 sq. kilometer

TABLE OF EQUIVALENTS

1 square yard	= .84 square meter
1 acre	= .405 hektare
1 square meter	= 1.2 square yards
1 hectare	= 2.47 acres

The square dekameter and the square hek-
tometer, when used to measure land, are called,
respectively, the *are* and the *hektare* (ha.).

CUBIC MEASURE

1,000 cubic millimeters	= 1 cubic centimeter
1,000 cubic centimeters	= 1 cubic decimeter
1,000 cubic decimeters	= 1 cubic meter
1,000 cubic meters	= 1 cubic dekameter
1,000 cubic dekameters	= 1 cubic hektometer
1,000 cubic hektometers	= 1 cubic kilometer

The cubic meter is called a *stère* when used
in measuring wood.

TABLE OF EQUIVALENTS

1 cubic inch	= 16.4 cubic centimeters
1 cubic foot	= 28.3 cubic decimeters
1 cubic yard	= .76 cubic meter
1 cubic centimeter	= .6 cubic inch
1 cubic decimeter	= .4 cubic foot
1 cubic meter	= 1.31 cubic yards

MEASURES OF CAPACITY

10 centiliters	= 1 deciliter
10 deciliters	= 1 liter
10 liters	= 1 dekaliter
10 dekaliters	= 1 hektoliter
10 hektoliters	= 1 kiloliter

TABLE OF EQUIVALENTS

1 dry quart	= 1.1 liters
1 liquid quart	= .95 liter
1 bushel	= .35 hektoliter
1 liter	= .91 dry quart
1 liter	= 1.06 liquid quarts
1 hektoliter	= 2.84 bushels

MEASURES OF WEIGHT

10 centigrams	= 1 decigram
10 decigrams	= 1 gram
10 grams	= 1 dekagram
10 dekagrams	= 1 hektogram
10 hektograms	= 1 kilogram
1,000 kilograms	= a metric ton = the weight of 1 cu. m. of water.

TABLE OF EQUIVALENTS

1 pound avoirdupois	= .45 kilogram
1 ton	= .91 metric ton
1 kilogram	= 2.2 pds. avoirdupois
1 metric ton	= 1.1 tons

Met'rónome, in music, an instrument for the measurement and regulation of time. As the directive terms usually prefixed to musical compositions, such as *adagio*, *lento*, *andante*, *allegro*, etc., can give to the performer only an approximate idea of the rate or velocity intended by the composer, various means have been employed to indicate the speed with more precision. The metronome, invented by John Maelzel, a mechanic in the service of the Emperor of Austria, and brought into use in the early part of the nineteenth century, is a simple but ingenious contrivance by which any degree of slowness or rapidity can be marked, and practically shown with the greatest exactness. The instrument is small and portable, in form between that of the pyramid and the obelisk, and consists of an inverted steel pendulum (8 or 9-in. long), on which is a sliding weight which may be moved up or down the pendulum, and thus brought opposite to any of the figures on a graduated scale in its rear. The pendulum is moved by simple wheelwork, and makes a loud tick for every vibration. The sliding weight determines the rate of vibration. If it is near the point of suspension, the motion will be rapid; and the rapidity decreases in proportion as the weight is moved toward the remote end. In practical use the object is to ascertain how many minims, crotchets, etc., of a given piece of music are to be performed in one minute. The numbers on the scale have therefore reference to a minute of time—i.e., when the weight is placed at 50, fifty beats or ticks will occur in each minute; when at 100, one hundred beats in a minute, etc. The rate at which any piece of music is to be played is thus easily found when the metronome mark is placed by the composer at the beginning. For example, $P=50$, means that when the sliding weight is placed at that figure on the graduated scale, the pendulum will vibrate once for every minim in the music, and that there will be fifty minims (or their value in other notes) in a minute of actual or clock time.

Metrodo'rus, (1) a philosopher of Chios (330 B.C.); (2) an Epicurean of Athens (277 B.C.); (3) a rhetorician and statesman of Scepsis under Mithridates Eupator (140 B.C.); (4) a philosopher of Stratonicea (110 B.C.); (5) a freedman of Cicero; (6) a writer of epigrams in the time of Constantine the Great.

Met'sya, Quintin. See **MASSYS**.

Met'ternich, Clemens Wenzel Nepomuk Lothar (Prince), 1773-1859; Austrian statesman; b. Coblenz; was sent in diplomatic service to The Hague, 1794; secretary of the Congress of Rastadt, 1797-99; ambassador at Dresden, 1801; at Berlin, 1803; at Paris, 1806; Minister of Foreign Affairs, 1809; Chancellor of the Empire, 1821-48. He kept Austria out of the great conflict of 1813 until she could make her own conditions for her participation, and at the Congress of Vienna, 1814, of which he was president, he procured for Austria a great extension of territory and a prominent position in Germany and Italy. By the congresses of Aix-la-Chapelle, 1818; Carlsbad,

1819; Vienna, 1820; Laybach, 1821; Verona, 1822; Münchengratz, 1833; Töplitz, 1835, etc., and the aid of the Holy Alliance he succeeded in suppressing almost every national or liberal movement in Europe.

Metz, city and fortress of Germany; in Alsace-Lorraine; on the Moselle; is one of the strongest fortresses in the world, seven forts crowning the hills around it. It is the seat of the highest authorities of Lorraine, of a bishop, of a civil and commercial tribunal, etc., and has an academy, college, two seminaries, school of artillery, museum, library, and arsenal. Brushes, fur, felt, leather, paper, soap, silk, woollens, embroideries, drugs, etc., are manufactured, and a brisk trade is carried on in wine, timber, corn, and hides. Metz, whose ancient name was Divodurum or Mediomatrix, was destroyed by Attila in the fifth century, then became the capital of Austrasia; fell, on the division of the empire of Charlemagne, to Germany, and was established as a free imperial city, governed by a count in the name of the emperor. By the Peace of Westphalia, 1648, the authority of France over Metz, as well as over Toul and Verdun, was acknowledged and guaranteed. In the War of 1870-71, the fortress formed the principal point of support for the imperial army drawn up along the German frontier, and after the first defeats at Weissenburg and Wörth it served as a retreat for the largest part of the army. Prince Frederick Charles inclosed Metz with an army of 200,000 men, and thus the memorable siege began. On October 27, 1870, the capitulation was concluded, according to which the fortress was to be occupied by the Germans, and the French army to go to Germany as prisoners of war. By the Peace of Frankfurt (May 10, 1871) Metz was ceded to the German Empire. Pop. (1905) 60,396.

Met'zu, Gabriel, 1615-59; Dutch painter; b. Leyden; formed his style on that of Terburg and Gerard Dow, but surpassed both in drawing; left many genre pictures of great excellence, of which the Louvre possesses the most famous examples, viz., the portrait of "Admiral Tromp," "A Soldier Offering Refreshments to a Lady," "A Chemist Reading near a Window," and "The Fruit Market at Amsterdam."

Meuse (müz), or **Maas** (mäs), river of Europe which rises in France, in the department of Haute-Marne; crosses the NW. corner of the department of Vosges; traverses the departments of Meuse and Ardennes; on reaching Givet, enters Belgium, and at Namur, where it receives on the left its largest tributary, the Sambre, changes its course to NE., and passes Liège, where it is augmented by the Ourthe. At Bommel it draws so close to the Rhine as to be brought into communication with it; finally turning NW., it joins the left bank of the Waal, one of the arms of the Rhine, and gives its name to the mighty accumulated flood of these streams. Proceeding W. the Meuse is divided near Dordrecht into two great rivers, one of which reaches Rotterdam; the other branch continues W.; and shortly after the

two branches again unite and discharge themselves, amid shoals and quicksands, into the North Sea; total length, 600 m., of which 460 are navigable.

Mexico (from Aztec *Mexitl*, name of a tutelary divinity), federal republic of N. America, occupying the whole width of the continent between the U. S. on the N. and Guatemala and British Honduras on the SE.; limited on the E. by the Gulf of Mexico and the Caribbean Sea, and on the W. and SW. by the Pacific Ocean. The main portion is about 1,950 m. in extreme length from NW. to SE., and 750 m. wide in the N. part, dwindling to 140 m. at the Isthmus of Tehuantepec. Besides this main body the republic includes the two peninsulas of lower California and Yucatan, owing to which the coast line aggregates over 6,000 m.; area (including islands) 767,005 sq. m.; pop. (1910) 15,063,207. It is divided into twenty-seven states, one federal district, and three territories. The chief cities are Mexico (capital), Puebla, Guadalajara, San Luis Potosi, Leon, Monterey, Pachuca, Zacatecas, Guanajuato, Merida, Querétaro, Morelia, Oaxaca, Orizaba, Aguas Calientes, Saltillo, Durango, Chihuahua, Vera Cruz, Toluca, Celaya.

The coasts are deeply indented with numerous bays and gulfs. The principal gulfs are those of Mexico and California. The gulfs of Campeche and Tehuantepec wash respectively the N. and S. shores of the Isthmus of Tehuantepec. The harbors on the Caribbean Sea, where the commerce is quite unimportant, are excellent. Those of the Gulf of Mexico are Progreso, Campeache, Tabasco, Coatzacoalcas, Vera Cruz, and Tuxpan. The ports of Tampico on the Panuco, and Matamoros on the Rio Grande should also be mentioned. By far the most commodious harbors are those on the Pacific and the Gulf of California, the principal being Acapulco, Manzanillo, San Blas, Mazatlan, Guaymas, and La Paz. In no part within 30 m. of the sea does the land rise higher than 1,000 ft., except perhaps in Chiapas; but the traveler journeying inland from either side N. of the Tehuantepec Isthmus climbs by a succession of gigantic terraced mountains to a table-land with a mean elevation of 8,000 ft.

The Cordillera of the Andes enters Mexico from Guatemala, and attains its maximum elevation somewhat S. of the parallel of Mexico City, between Toluca on one side and Jalapa and Cordova on the other, where several peaks rise to 15,000 and 17,000 ft. above the sea. Farther N. the Sierra Madre runs N. by W. toward Guanajuato; near it, it separates into three distinct branches. The central branch, or Cordillera de Anahuac, the highest of three, takes successively the names of Sierra de Acha, Sierra de los Mimbres, Sierra Verde, and Sierra de las Grullas. The W. chain is the Cordillera proper. The volcanoes, Popocatepetl (17,798 ft.), Orizaba (18,314), Iztaccihuatl (16,076), Toluca, Jorullo, and Colima (12,743), form an E. and W. line nearly across the republic. The largest river is the Rio Bravo del Norte, or Rio Grande, which forms part of the boundary with the U. S., collecting the waters of the Mexican rivers, Conchos, Salada, and Sabinas. Other rivers flowing into the gulf, in order from the

N., are the Santander, Panuco, Alvarado, Coatzacoalcas, Grijalva or Tabasco, and Usumasinta. The Chimalapa, Verde, Mescala or Balsas, and Santiago or Lerma (named in their order from S. to N.) are the largest rivers flowing into the Pacific. Principal among the rivers flowing into the Gulf of California are the Culiacan, Fuerte, Mayo, Yaqui, and Colorado. The most important lakes are Tezcuco, Chalco, Xochimilco, Xaltocan, Zumpango, San Cristobal, and Chapala.

In point of climate Mexico is divided into three great terraces: the coast region, or tierras calientes (hot lands); the mountain slopes, or tierras templadas (temperate lands); and the elevated plateaus, or tierras frias (cold lands). The first region comprises all the country lower than 3,000 ft. above the sea; the second extends from 3,000 to the mean elevation of the central table-land, 6,000 ft.; and the third embraces all above this. The mean annual temperature in the tierras calientes is from 75° to 85°; in the tierras templadas, from 65° to 72°; and in the so-called cold regions the mean temperature is from 55° to 60° in the dry season, and never higher than 80° in the wet. The useful indigenous plants include mahogany, tropical cedar, ebony, rosewood, and a large number of other cabinet woods in the lowlands, besides oak and pine in the mountains; rubber, copal, and various gums; jalap, cassia, ipecacuanha, and many other medicinal species; logwood, arnatto, indigo, cartamo, and other dyes; and vanilla. Two species of *Agave* are particularly valuable, and both are now cultivated on a large scale: the *A. americana*, or the maguey plant of the high plateau, the juice of which, fermented, is chicha, a national beverage; and the henequen plant of the lowlands, yielding sisal hemp, now the principal product of Yucatan.

In mineral wealth Mexico stands in the first rank, and her riches are practically inexhaustible. Nearly all the metals exist, but among them silver is especially prominent. At present the great silver regions are Zacatecas, San Luis Potosi, Chihuahua, Coahuila, Guanajuato, and Hidalgo; but there are mines in nearly all the states. Placer gold mines are profitably worked in Mexico, Michoacan, Guerrero, and some of the N. states. Cinnabar is widely distributed. Lead occurs principally in connection with silver ores, but also separate. Copper deposits are said to be very extensive, notably in Michoacan, Chiapas, and Sonora. Tin, zinc, platinum, bismuth, antimony, etc., have been reported. Iron (magnetic ore principally) occurs in immense and very rich beds. There are beds of coal in many states, and that of Coahuila is exported to the U. S. in considerable quantities. That of Sonora is anthracite. Sulphur exists in large quantities in the volcanic craters. Salt is obtained in the coast lagoons and in mines of the N. states, and asphaltum and petroleum are said to be found in paying quantities. Marble of fine quality is mined in Mexico, Nuevo Leon, etc., and appears to be widely distributed. The beautiful Mexican onyx (a semitransparent alabaster) is quarried in Puebla. Many kinds of precious stones are reported, but the only ones of im-

portance at present are opals. The value of silver mined annually exceeds \$38,000,000; gold, \$24,000,000; copper, \$16,000,000. Important metallurgical works are carried on at San Luis Potosí, Monterey, Durango, and Aguas Calientes. On the higher lands maize and beans are the most important agricultural products; wheat and other cereals grow well in some places, but are not extensively cultivated. Maguay is largely grown in many places. In the tierras templadas and calientes the principal crops, besides maize and manioc, are coffee of excellent quality, especially in Vera Cruz and Colima; tobacco in Vera Cruz, Jalisco, Oaxaca, etc.; cacao in Tabasco and Campeche; rice in Morelos and the gulf states; henequen in Yucatan, and sugar cane in nearly all the states.

The cotton factories of Puebla, Jalisco, Vera Cruz, Coahuila, Tlaxcala, and the federal district employ many thousand operatives. Carpets, woolen underwear, and cloths are produced on a considerable scale. There are numerous flour mills and distilleries, a few breweries, soap factories, paper mills, powder mills, tile factories, etc. Vera Cruz is the principal center for the manufacture of cigars and cigarettes. The peculiar broad-brimmed Mexican hats, saddles, silver ornaments, jewelry, etc., are generally made at small establishments; to these may be added furniture, clothing, books, etc. The handiwork peculiar to the Indians includes various kinds of terra-cotta and glazed pottery, often highly artistic and much prized; feather work, hammocks, artificial flowers, etc. The total imports (1910-1) had a value of \$102,506,000; exports, \$146,289,000. The leading exports are silver, gold, copper, henequen, coffee, and hides. Value of exports to the U. S., 1911, \$111,799,000; imports from the U. S., \$56,318,000.

The constitution of February 5, 1857, is in force, but has been several times amended. It is very similar to that of the U. S. The states are free and sovereign in the control of their internal affairs. The federal executive is a president, chosen for six years by indirect popular suffrage, and assisted by a cabinet of eight secretaries. He may be reelected. The constitution guarantees freedom of speech and religion and freedom of the press, subject only to the regular action of the laws. The army on a peace footing numbers about 26,000 men. The navy is very small. Most Mexicans are Roman Catholics, and until 1857 the Roman Catholic was the state religion. Public schools are supported by the national and state governments, and are unsectarian. Primary education is compulsory in all of the states. The National Univ., opened 1553, has been abolished, its place being taken by schools of law, medicine, and engineering, which are in a flourishing condition. There are various other institutions for higher education in Mexico and in the state capitals supported by public or private means and by the Church.

Before its discovery by the Spaniards, Mexico was occupied by several Indian races, the Nahuas (Aztecs, etc.) being dominant in the S. part of the plateau, with their principal towns about the lakes in the valley of Mexico.

The exploration of the gulf coast by Grijalva, 1518, was followed by the Spanish invasion of the country, 1519. The Spanish colony of New Spain, thus formed, was erected into a viceroyalty, and rapidly became the richest European possession in the New World, with the single exception of Peru. New Spain was divided into the three "kingdoms" of New Spain, New Galicia, and New Leon, corresponding to S., NW., and NE. Mexico, to which were added the territories of Texas, New Mexico, and California, with an undefined extent to the N. All important civil and ecclesiastical offices were absorbed by Spaniards. The Creoles, or whites, born in the country had few privileges, and suffered from unjust and heavy taxation and oppressive laws; and the Indians and mestizoes were kept in a state of degradation and semi-servitude. To these grievances were added the tyranny of the Inquisition, the lack of security for personal liberty, and the venality of the courts. Still loyalty to Spain was, by no means dead, and when, 1821, a young army officer named Iturbide advanced the plan of an independent Mexican empire under a Spanish Bourbon prince, it was eagerly seized upon even by the avowed republicans, and generally by the army. Iturbide and Guerrero marched on Mexico, and the last viceroy was forced to give in his adhesion to their plan. Spain refused to ratify this treaty with "rebels," and the first Mexican Congress made Iturbide himself emperor, June, 1822.

After a troubled reign of less than a year Iturbide was deposed and a republic was formed. The term of the first president, Victoria, 1824-28, was generally prosperous, but soon after it ended the republic was plunged into civil war, and for many years was subject to the military dictatorship of Santa Anna. During this period Texas seceded and joined the U. S., leading to a war with that republic, 1846-47, which terminated in the cession to the U. S. of all the territory N. of the Rio Grande, and California. The final deposition of Santa Anna, 1854, opened the way to the reformed constitution of 1857, but this change involved the long and bitter struggle of the "Reform War," 1857-60. The triumph of the reform party under the Indian statesman, Juarez, was hardly accomplished before France interfered in the affairs of Mexico, 1861, and made the ill-fated Maximilian emperor. The U. S. finally forced the French to withdraw. Maximilian was soon defeated and shot by the republicans, 1867, and Juarez, who had bravely upheld the constitution even when driven from the country, was reinstated, and ruled until his death. Gen. Porfirio Diaz held the presidency 1877-80 and 1884-1911. Revolutions followed in quick order, and because of outrages on American persons and property, the U. S., after trying peaceful means, maintained a punitive expedition in Mexico, in 1914-16, under Gen. Pershing.

Mexico, state in republic of same name; borders on Querétaro, Hidalgo, Tlaxcala, Puebla, Morelos, Guerrero, and Michoacan; area, 9,247 sq. m.; pop. (1910) 975,019; capital, Toluca.

Mexico, capital of the Mexican Republic; in the federal district; about 7,350 ft. above the

sea; 263 m. W. from Vera Cruz. The site of the city was originally a marshy island in Lake Texcoco. Here, according to their own accounts, the Aztecs settled, 1325, calling their *pueblo* Tenochtitlan and sometimes Mexitli (apparently an appellation of the war god, Huitzilopochtli). The island was partially protected from floods by a dike, and was approached by causeways. The Aztec capital was taken by the Spaniards, 1521, after most of the low buildings composing it had been destroyed. Cortes made the mistake of building his capital on the ruins of the old city, though there was plenty of high ground near. The waters of the lakes have receded, and the city is now several miles from the nearest of them, though still approached by causeways over low ground; canals, bordered by vegetable and flower gardens, connect the outskirts with Texcoco and Chochimilco.

The city, naturally unhealthful, has been brought into satisfactory sanitary conditions by means of great drainage and sewage canals. There are two fine aqueducts, bringing a somewhat inadequate water supply from the hills. Mexico is regularly laid out, with moderately wide streets, which cross each other at right angles, and are usually well paved and lighted. The central square, adorned by a garden, is faced by the cathedral, which is on or near the principal Aztec temple (*teocalli*). The present building, begun 1573, and consecrated, 1645, is regarded as the finest church edifice in Spanish America. Another side of the square is occupied by the government palace, on the site of that of Montezuma and of the viceroys. It now contains the principal government offices, Senate Chamber, Hall of Ambassadors, etc., and the government pawn shop, an important institution. Other buildings of interest are the offices of the Inquisition (now turned into a medical school), the mint (the oldest in the republic), customhouse, convent of Santo Domingo, various churches, and the numerous charitable institutions. The Pantheon contains many elaborate monuments, the finest being that in honor of Juarez.

The better class of dwellings are solidly built of stone, with interior courts; living rooms are generally on the second floor. The National Museum is especially rich in antiquities, including the sacrificial stone, hideous idols, etc., found near the site of the *teocalli*, and sculptures from the S. states and Yucatan. There are several libraries, the most important, and perhaps the most valuable in America, being the Biblioteca Nacional, with upward of 250,000 volumes, and a priceless collection of historical manuscripts. The Academy of San Carlos contains many valuable paintings by old masters. There are excellent astronomical and meteorological observatories; several scientific schools receive government aid; and schools of law, medicine, pharmacy, engineering, technology, fine arts, music, etc., take the place of the old university. The principal outdoor resorts are the Alameda, a public park and promenade with superb trees; the Paseo de la Viga, along a canal of that name; and the Paseo de Bucareli, continued to Chapultepec in the Paseo de la Reformas, and adorned

with a fine bronze equestrian statue of Charles IV and monuments to Columbus, Guatemotzin, and Cortes. Mexico is now connected by rail with most of the states and the U. S., and is a center of manufactures and commerce. Pop. (1910) 470,659.

Mexico, Gulf of, vast inland sea, nearly surrounded by the U. S. and Mexico, and partially shut off from the Atlantic by the island of Cuba; is connected with the Atlantic by two comparatively shallow channels known as the Straits of Florida and the Yucatan Channel; former has maximum depth of 344 fathoms and a cross section of 11 sq. m.; the latter, with a greatest depth of 1,164 fathoms, has a cross section of 110 sq. m.; area, 595,000 sq. m.; greatest depth, 2,119 fathoms. A submarine plateau to the NW. of the center of the Gulf, and below 2,000 fathoms, is known as Sigsbee's Deep, after its discoverer. The N. part of the Gulf has been filled with sediment from the Mississippi, and many facts indicate that the bottom in that region is slowly subsiding on account of the weight of the silt deposited upon it.

Meyer (mî'ér), Heinrich August Wilhelm, 1800-73; German biblical commentator; b. Gotha; was pastor successively at Osthausen, Harste, Hoya, and Neustadt; resided in Hanover after 1848; was noted as an exegetical commentator on the New Testament, uniting sound learning and the most searching criticism with an orthodox, conservative faith.

Meyer, Johann Georg, called MEYER VON BREMEN, 1813-86; German genre painter; b. Bremen; was a pupil of Düsseldorf Academy; settled in Berlin, 1852; became Prof. of the Academy there, 1863; was a member of the Amsterdam Academy. He was awarded a medal at the Centennial Exhibition, Philadelphia, 1876. His pictures, almost all of small size, brought high prices during his lifetime, and many of them are owned in the U. S. "The Letter" is in the Wolfe collection, Metropolitan Museum, New York.

Meyerbeer (mî'ér-bär), Giacomo (Italianized form of JAKOB MEYER BEER), 1791-1864; German opera composer; b. Berlin; son of James Beer, a wealthy Hebrew; after studying in Vogler's select school at Darmstadt, produced the operas "Jephtha" and "Die Beiden Kalifen," which were failures; then for a time confined himself to piano playing and achieved great distinction in Vienna. Meyerbeer now went to Italy to study the methods of its operatic school and with his "Romilda e Costanza," "Semiramide," 1819, "Emma di Resburgo," 1820, and "L'Esule di Grenata," 1822, attained popularity, "Margherita d'Anjou," 1822, and "Il Crociato in Egitto," 1824, being received with marked favor at Milan and Venice respectively. In 1828 Meyerbeer removed to Paris, where were first produced "Robert le Diable," 1831 (receiving unprecedented enthusiasm); "Les Huguenots," 1836, which marked an epoch in operatic art; "Le Prophète," 1849; "Pierce le Grand," 1854; "L'Étoile du Nord," 1854; "Dinorah," also known as "Le Pardon de Ploermel," 1858; "L'Africaine," and others.

Meyr (mtr), Melchior, 1810-71; German author; b. Ehringen, Bavaria; lived in Berlin, 1840-52; afterwards alternately at Munich and Ehingen. His best-known works are "Duke Albert," "Stories from the Ries," "Charles the Bold," "New Stories from the Ries." His stories of peasant life rank among the best written in the German language.

Meze'reon, in materia medica, the bark of shrubs belonging to the genus *Daphne*, especially *D. mezereum*, *D. laureola*, and *D. gnidium*. They are natives of Europe and Asia, sometimes seen in cultivation in the U. S. They are of the order *Thymeleaceae*. The bark has strongly irritant-narcotic properties. It was once extensively employed in medicine, and now has a limited use in cases of rheumatism and other diseases. The fresh bark will quickly blister the skin.

Mézières, fortified town; capital of the department of Ardennes, France; on the Meuse, opposite Charleville, with which it is connected by a bridge. It is 155 m. NE. of Paris. In 1520 it was successfully defended by Bayard against Charles V, and his banner is still preserved in the hôtel de ville. The present fortifications were planned by Vauban. The iron industry has gradually been concentrated at Charleville. Pop. (1901) 5,872.

Mezzo (méd'zō), in music, a term of diminution, signifying the half, middle, or mean between two things of a positive nature or description. Thus a mezzo-soprano voice is one whose range is between the soprano and alto. Mezzo forte (or *m. f.*) is rather loud, and mezzo piano (or *m. p.*) rather soft. Mezzo voce, in like manner, implies the use of only half of the usual force of the voice.

Mezzofanti (mēt-zō-fān'tē), Giuseppe Gaspar-do, 1774-1849; Italian linguist; b. Bologna; at the age of fifteen, besides Greek and Latin, already knew many foreign European languages; having entered the priesthood, 1797, was appointed Prof. of Oriental Languages and librarian at Bologna; 1831, removed to Rome; 1833, succeeded Angelo Mai as chief keeper of the Vatican Library, and, 1838, was made a cardinal. He is said to have spoken over fifty languages.

Miako (mā-kō), Japanese name meaning "metropolis," and therefore synonymous with Kioto, frequently applied to the old capital of Japan, now called Sai-kio, or "W. capital," to distinguish it from Tokyo (literally, "E. capital"), the present capital of the country.

Miami (mi-ām'i) River, in Dade Co., Fla.; formed in the Everglades by outlets of Lake Okeechobee. It flows into Biscayne Bay. Also the name of a stream of Ohio; rises in Hardin Co., runs in a SW. course, passing the cities of Troy, Dayton, and Hamilton; is a rapid stream, flowing through a beautiful, fertile, and populous valley, and joining the Ohio below Cincinnati; is 150 m. long, and furnishes much water power. A canal extends along the river. The Little Miami is a smaller, unnavigable stream, flowing through a fertile and hilly region to the E. of the Miami, and reaching the Ohio 6 m. above Cincinnati.

Miantonomoh (mi-ān-tō-nō'mō), d. 1643; sachem of the Narragansett Indians and nephew of Canonicus; assumed the government about 1636, and in that year concluded an alliance with the government of Massachusetts; aided the colonists in the Pequot War, 1637, and was friendly to Roger Williams and other early settlers of Rhode Island, to whom he made grants of land. Having engaged in war with Uncas, sachem of the Mohegans, he was taken prisoner at Great Plains, near Norwich, carried to Hartford, and by the advice and consent of the commissioners of the United Colonies was returned to Uncas to be executed.

Miao-tse, or **Meao-tse** (myow-tzā') (literally, "sons of the soil"), aboriginal tribes who early appear in Chinese history, and who formerly occupied extensive tracts in central China, but who were driven by the advancing Chinese into the more inaccessible mountain regions of the S. and SW., chiefly Kwei-chow and Kwangsi, where they still maintain a practical independence. Some have gradually become assimilated to the Chinese, and a few have risen to position among the mandarins. They are divided into about fifty clans, ranged in several larger divisions, known as the Red, the White, the Blue, and the Black Miao, from the color of their dress.

Miaoulis (mē-ow'lis), Andreas Vokos, 1770-1835; Greek revolutionist; b. Hydra, where he received his surname Miaoulis from his commanding a felucca (Turk. *miaoul*). During the Greek revolution was made commander in chief of the fleet, and gained brilliant successes over greatly superior Ottoman and Egyptian forces. He resigned in favor of Lord Cochrane, and continued to serve as a simple captain. Afterwards he was reinstated in his office by Capodistrias, the President of Greece, but joined the opposition and became involved in the political controversies of the time.

Mias'ma. See **MALARIA**.

Mi'ca, in mineralogy, a group of the silicates distinguished by their remarkable leaf-like structure, the elasticity of their thin plates, and their half-metallic luster. The minerals crystallize in right rhomboidal prisms, which separate with the greatest facility in thin foliæ parallel with the base of the crystal. The colors are various; the most common are silvery white, grayish green, red, and black. The hardness of the mineral is 2 to 3; specific gravity, 2.65 to 3.3. The composition of the most common micas is from 45 to 50 per cent of silica, 32 to 38 of alumina, and 10 to 15 of alkali, usually either potash or magnesia, by which they are divided into potash micas and magnesia micas. Sometimes soda and potash exist together, and some of the potash micas contain lithia. The potash micas are also called lepidolite and muscovite, and the magnesia micas phlogopite and biotite. There are also generally traces of iron, rubidia, and caesia. Mica is used mostly for the doors of stoves and the sides of lanterns, for which it is well adapted by its transparency and refractory character. It is used largely as an insulating material in electrical work. It has also

been used for windows. Ground mica is used as a decorating material in the manufacture of wall paper. The chief sources of supply in the U. S. are mines in Haywood, Yancey, Mitchell, and Macon cos., N. C., where the mineral is found in granite rock, and Grafton Co., N. H. A considerable quantity is imported from Canada, the principal deposits being in Ottawa Co.

Mi'cah, one of the minor Hebrew prophets; b. Moresheth, near Gath. He lived in the latter half of the eighth century B.C., and was a contemporary of Isaiah. Micah iii, 12 is quoted in Jeremiah xxvi, 18, to justify the latter in foretelling the destruction of Jerusalem. Micah's prophecies are written in a vivid, poetical style, and refer chiefly to the fate awaiting the two Hebrew nations. The style is not unlike that of Isaiah. Micah deals with social and popular rather than political sins.

Mi'ca Schist, metamorphic stratified, schistose, crystalline rock, always foliated in texture, and composed of variable proportions of mica and quartz. It gradually passes in one direction into gneiss and in another into quartz schist. Argillaceous mica schist, according to Cotta, may be regarded as "an imperfect mica schist, or as a somewhat crystallized clay slate."

Michael (mī'kēl), Hebrew, "who is as God," angel who had special charge of the Israelites as a nation (Daniel x, 13, 31), who disputed with Satan about the body of Moses (Jude 9), and who with his angels carried on war with Satan and his angels in the upper regions (Revelations xii, 7-9). In later writings he is classed as an archangel. The feast of St. Michael was instituted by Pope Felix III, 483-92.

Michelangelo (mē-kēl-ān'jā-lō). See MICHELANGELO.

Michaelis (mē-chā-ā'lis), **Johann David**, 1717-91; German theologian; b. Halle; was appointed professor, 1745, at the Univ. of Göttingen. His writings, the results of immense learning and great acuteness, contributed much to a fuller understanding of Holy Writ, especially the Old Testament; chief works, "Introduction to the New Testament" and "Commentaries on the Laws of Moses."

Michaelmas (mīk'ēl-mās), festival of St. Michael the Archangel; celebrated September 29th.

Michaud (mē-shō'), **Joseph François**, 1767-1839; French journalist and historian; b. Albens, Savoy; after 1791, a contributor in Paris to royalist papers; founded, 1794, the *Quotidienne*; was banished by the Directory, 1795; returned to Paris under the consular government, but adhered to the Bourbon cause; formed with his brother and Giguet a publishing firm; after the restoration renewed the *Quotidienne*. His works include "Rise and Fall of the Empire of Mysore," "History of the Crusades." He also participated in the production of the "Biographie Universelle," 1811-28.

Michaux (mē-shō'), **André**, 1746-1802; French botanist; b. Satory, near Versailles; was,

1785-97, French agent in N. America for the collection of useful trees and shrubs for naturalization in France; made near Charleston, S. C., and New York (Bergen Co., N. J.), large nurseries for arboriculture. In 1796 he returned to France; 1800, went to Madagascar, where he died; principal works, "Treatise on the Oaks of North America" and a "Flora Boreali-Americana."

Michaux, François André, 1770-1855; French botanist; son of André Michaux; b. at Versailles; for a time was his father's assistant in the U. S., and was himself sent, 1802, and again, 1808, to study the botany of the Mississippi Valley and collect useful seeds. He published a "Treatise on the Naturalization of American Forest Trees," "Journal" of his travels; a work on the Bermudas; "North American Sylva," completed by Nuttall and others.

Michel (mē-shēl'), **Georges**, 1763-1843; French landscape painter; b. Paris. His pictures, long unnoticed, have come into prominence in artistic circles by their being included in exhibitions with the works of Millet, Rousseau, Corot, and their contemporaries. His compositions are almost all of the same general character and are almost monotone in color.

Michel, Louise, 1839-1905; French revolutionist; popularly styled "The Red Virgin of France" and "The Red Sister of Charity"; b. Vroncourt, Haute-Marne; won distinction by her musical and poetical talents; opened a school in Montmartre, Paris, 1860; during the Commune, 1870, fought on the barricades in the uniform of the National Guard; was taken prisoner at Versailles and sentenced to death, but the sentence was commuted to transportation to New Caledonia for life; returned to Paris on the granting of amnesty to political prisoners, 1880. Her continued activity and communistic undertakings led to her imprisonment, 1883 and 1886. Later she took up her residence in London. She published "Memoirs" and a novel, "The Microbes of Society."

Michelangelo (mē-kēl-ān'jā-lō), or **Michel-agnolo Buonarroti** (bō-ō-nār-rōt'ē), 1475-1563; Italian painter, sculptor, and architect; b. Tuscany; was descended from the family of the counts of Canossa. His father, Lodovico Leonardo Buonarroti Simone, was at the time of the artist's birth Governor of Caprese and Chiusi. In 1488 Michelangelo became a pupil of Ghirlandaio. Lorenzo de' Medici afterwards took him under his patronage and gave him rooms in his palace, where he studied until his patron's death, 1492. A successful imitation of an antique, a sleeping Cupid, bought by Cardinal San Giorgio for 200 ducats, was the occasion of his first visit to Rome, where he executed several works, the most distinguished of which is the "Pietà," now an altarpiece in a chapel near the entrance of St. Peter's. A change in the government of Florence induced him to go thither, and in eighteen months he produced the colossal statue of David which stands in the Piazza del Gran Duca. He soon returned to Rome by invitation of

Julius II, who gave him an unlimited commission to build a mausoleum. The design was too magnificent for the church it was to adorn, and the pope, after some thought, determined to rebuild St. Peter's as a fit covering for his superb monument. A misunderstanding with the pope suspended this great work. Michelangelo's masterpiece of sculpture, Moses, was to form a part of it. A reconciliation was effected, 1506.

In 1508 the artist, with great reluctance, consented to decorate the Sistine Chapel with frescoes, and the whole ceiling was actually painted in twenty months. He was making studies for the other paintings when his patron died, and the work was suspended. Leo X occupied him the whole nine years of his reign in the quarries of Pietra Santa getting out inferior marble for the façade of the Church of San Lorenzo, in Florence. In 1533 he was ordered by Clement VII to paint the walls of the Sistine Chapel, and the "Last Judgment" was opened to the public on Christmas Day, 1541, Paul III being pontiff. He afterwards completed the "Conversion of St. Paul" and the "Crucifixion of St. Peter" for the Capella Paolina. When he was over seventy years old Paul III summoned him to succeed San Gallo as architect of St. Peter's. He had also to carry forward the Palazzo Farnese, construct a palace on the Capitoline Hill, adorn the hill with antique statues, make a flight of steps to the church of the Convent of Ara Cœli, rebuild an old bridge across the Tiber, and convert the baths of Diocletian into the magnificent Church of Sta. Maria degli Angeli. Under Pius IV St. Peter's was carried up as far as the dome, which was modeled in clay and carefully executed to a scale in wood; but the architect had no time to direct its construction. A slow fever attacked him in February, 1563, and in a few days put an end to his life. Michelangelo applied himself to every branch of knowledge connected with painting and sculpture. His acquaintance with anatomy was great, and also with mechanics. He was also a poet of a very high order, his sonnets being among the noblest in that kind of literature.

Michelet (mê-sh'la'), Jules, 1798-1874; French author; b. Paris; after the Revolution of 1830 was appointed chief of the historical section of the royal archives, and, 1838, Prof. of History and Morals at the Collège de France; lost both places, 1851, as he refused to take the oath of allegiance to Louis Napoleon. His historical works include "History of France," "History of the Revolution," "History of the Nineteenth Century"; his polemical writings, "The Jesuits" (in conjunction with Edgar Quinet), "Woman, Priest, and Family"; his miscellaneous works, "The Bird," "Love," "Woman," "The Sea," "The Bible of Humanity."

Michelet (mê-shê-la'), Karl Ludwig, 1801-93; German philosopher; b. Berlin; Prof. of Philosophy and Philology in the French gymnasium at Berlin, 1825-29; and of Philosophy at the university after 1829. His works include "The Ethics of Aristotle," "Critical Exam-

ination of Aristotle's Metaphysics" (crowned by the Academy of Moral Sciences, Paris), "History of the Last Systems of Philosophy in Germany," "The Historic Christ."

Michelozzo Michelozzi (mê-kê-lôt'sô mê-kê-lôt'sè), Bartolommeo di Gherardo di, 1396-1472; Italian sculptor and architect; b. Florence; worked with Donatello, whom he helped at Naples with the Brancacci monument; built for Cosmo de' Medici the palace now known as the Palazzo Riccardi; followed this patron into exile to Venice, where he built the Library of St. George for the Benedictine monks. On his return to Florence with Cosmo built the Dominican Convent of St. Mark, constructed the Tornabuoni Palace, and, by order of Piero de' Medici, designed a chapel in the Church of the Virgine Annunziata. A statue of "Faith" in the Baptistery in the same city is his work. When Francesco Sforza bestowed a palace in Milan on Cosmo, Michelozzi was sent to enlarge and ornament it with sculpture. The chapel of St. Peter, Martyr, in St. Eustorgio, of Milan, is also his work.

Mich'igan (from Indian MITCHI SAWGYEGAN, literally "Lake Country"), popular names, WOLVERINE STATE, LAKE STATE; state flower, apple blossom; state in the N. central division of the American union. It consists of two peninsulas, of which the Upper or N. is bounded N. by Lake Superior; E. by St. Mary's Strait; S. by Lake Huron, the Strait of Mack-



inac, and Lake Michigan; and SW. by Wisconsin; is 318 m. in greatest length from E. to W., and from 30 to 164 m. wide, embracing about $\frac{1}{3}$ of the area of the state; the Lower, resting on Ohio and Indiana, is bounded W. by Lake Michigan; N. by Lake Michigan, the Strait of Mackinac, and Lake Huron; E. by Lake Huron, St. Clair River and lake, Detroit River, and Lake Erie; extreme length, 300 m.; average breadth, 200 m.; total area of state, 57,980 sq. m.; pop. (1910 census) 2,810,173; capital, Lansing; principal cities and towns: Detroit, Grand Rapids, Saginaw, Bay City, Jackson, Kalamazoo, Muskegon, Port Huron, Battle Creek, Lansing (capital), Ann Arbor, Manistee, Ishpeming, W. Bay City, Flint, Menominee, Alpena, Sault Ste. Marie, Marquette,

Pontiac, Ironwood, Adrian, Escanaba, Traverse City, and Iron Mountain.

The portion of the Upper or N. Peninsula E. of the meridian of Marquette is an undulating plateau, with numerous lakes and marshes. Soft woods, including pine, are the prevailing growth, but fine groves of sugar maple and beech also occur. W. of the plateau the country is irregularly mountainous, though with no summits of more than 1,400 ft. above Lake Superior, interspersed with swamps and lakes. The NW. extremity of the peninsula is occupied by the Mineral or Copper range, which properly consists of three ranges: the main or central range, extending from Keweenaw Point far into Wisconsin, flanked on the N. by the Porcupine Mountain range (2,023 ft.), and on the S. by the S. Copper range. The timber here, which is abundant and excellent, is generally sugar maple. Immediately S. of the S. Copper range is the Iron range. The N. Peninsula contains most of the mineral wealth of the state, but the soil is generally sterile. The S. Peninsula, between lakes Huron and Michigan, is generally level. The soil, except in the N. part, is luxuriantly fertile. The principal islands belonging to the state are Isle Royal and Grand Island in Lake Superior; Sugar and Nebish islands in St. Mary's Strait, and Drummond's Island at its mouth; Marquette, Mackinac, and Bois Blanc islands in the N. part of Lake Huron, near the mouth of the Strait of Mackinac; and the Beaver, Fox, and Manitou groups in the N. part of Lake Michigan.

The principal rivers are the Ontonagon and Tequamenon, flowing into Lake Superior; the Cheboygan, Thunder Bay, Au Sable, and Saginaw, into Lake Huron; the Huron and Raisin, into Lake Erie; and the St. Joseph, Kalamazoo, Grand, Muskegon, Manistee, Grand Traverse, Manistique, and Escanaba, into Lake Michigan. The climate is one of extremes, but much tempered by the proximity of the lakes. That of the S. Peninsula is comparatively mild, while that of the N., especially in winter, is cold and rigorous. The mean annual temperature at Detroit is about 47.25°; at Grand Haven, 44.6°; at Escanaba, 40.01°; at Marquette, 38.3°. The agricultural resources of the Upper Peninsula are comparatively undeveloped. The chief crops of the state (1911) were corn, 55,770,000 bu.; oats, 42,900,000; wheat, 18,450,000. Potatoes and hay are also important crops. In 1907 the output of beet sugar was 151,347 tons. The fruit crop is varied. The apple crop in particular is large, varying between the extremes of 1,500,000 and 5,000,000 bbls. annually. The peach belt of the state lies chiefly under the lee of Lake Michigan. The yearly peach crop is from 500,000 to 1,000,000 bu. The various kinds of small fruits are largely cultivated. The iron (magnetite and red hematite) and copper mines of the Upper Peninsula are noted. In the production of copper Michigan stands next to Montana and Arizona. Other mineral products include salt, gypsum, sandstone, coal, Portland cement, grindstones, asbestos, silver, graphite, and petroleum; total value of mineral products (1910) \$89,165,360, including copper, \$28,-

125,799, and iron ores, \$41,393,585. The manufacturing industries are concerned chiefly with lumber, timber, and agricultural products, metal working and machinery. In 1908 the largest amount of capital was employed in lumber and timber industries. According to the U. S. census of 1909 the state had 9,157 "factory-system" manufacturing plants, operated on a capital of \$583,947,000, and yielding products valued at \$685,109,000, including wooden wares, furniture, and other lumber products, iron, machinery, hollow ware, iron castings, farm implements, cotton and woolen goods, carriages and wagons, leather and leather goods, forest products (potash, etc.), beet sugar, and salt. The fisheries give employment to over 4,000 men, and yield annually about 35,000,000 lb. of fish. Two thirds of the catch consists of trout and whitefish, of which Lake Michigan yields nearly half, while the rest is furnished in equal proportions by Lake Superior and Lake Huron. To replenish the lakes and streams a number of hatcheries have been established.

Michigan has a large foreign commerce, chiefly with Canada, the exports including iron ore, copper, salt, building stone, lumber, grain, fish, meats, fruit, carriages, and railway cars. The U. S. customs districts and ports of entry are Detroit, Grand Rapids, Huron, Michigan City, and Superior, and during the fiscal year 1910-1 the tonnage of sailing and steam vessels entering the lake ports was 2,351,495; clearing, 1,907,038; value of imports of domestic and foreign merchandise, \$17,575,199; exports, \$82,143,633. Leading religious denominations: Roman Catholic, Methodist Episcopal, Lutheran, Baptist, Presbyterian, Congregational, and Protestant Episcopal. The educational system of the state culminates in the Univ. of Michigan, a state institution. The normal schools at Ypsilanti, Mount Pleasant, and Marquette, the Agricultural College at Lansing, and the Mining School at Houghton complete the list of state educational institutions.

The discovery and early settlement of the region are due to the French missionaries and fur traders. The site of Detroit was visited as early as 1610, and, 1641, some French Jesuits reached the Falls of the St. Mary. The first European settlement within the limits of the state was the mission of Sault Ste. Marie, which was founded by Father Marquette and others, 1668. In 1701 an expedition under Antoine de la Mothe Cadillac founded Detroit. Michigan came under the dominion of Great Britain, with other French possessions, 1763. On the expulsion of the French the conspiracy headed by the Indian chief Pontiac, and designed for the extermination of the whites, broke out and involved the settlements in bloodshed. On the treaty of peace which closed the Revolutionary War, Michigan was not at once surrendered, and the Americans did not take possession of Detroit till 1796. In 1805 Michigan, which had originally formed part of the Northwest Territory, and, after its division, 1800, the Territory of Indiana, was constituted a separate territory. During the War of 1812-15 it was exposed to great suffering. Detroit

was taken by the British, August, 1812. They were afterwards driven out of the territory by Gen. Harrison; and, October, 1814, a truce was concluded with the Indians. In 1836 Wisconsin Territory was formed from the W. portion of Michigan. In 1837 Michigan was admitted into the Union. In 1847 the seat of government was removed from Detroit to Lansing. In 1850 a new constitution was adopted, which with amendments continues in force.

Michigan Cit'y, city in Laporte Co., Ind.; on Lake Michigan; 50 m. E. of Chicago; has an extensive trade in lumber, salt, and iron ore; manufactures foundry products, railroad cars, glass, chairs, and worked lumber; has an outer harbor of refuge built by the U. S. Govt.; and contains the N. Indiana Penitentiary, St. Mary's Academy (Roman Catholic), St. John's and St. Luke's schools (Lutheran), U. S. Life Saving Station, and sanitarium. Pop. (1910) 19,027.

Michigan, Lake, one of the five Great Lakes of the U. S., the only one entirely within their limits, bounded N. by the Upper Peninsula of Michigan, E. by the Lower Peninsula of Michigan, S. by Indiana, and W. by Illinois and Wisconsin; length N. and S., 320 m.; mean breadth, 70 m.; mean depth, 1,000 ft.; elevation above the sea level, 589 ft.; area, 22,400 sq. m. At the NE. it communicates with Lake Huron by the Straits of Mackinac, 4 m. wide; in the NW. Green Bay extends S. into Wisconsin. The lake has few harbors and bays, and the only islands are at its NE. extremity. It is subject to severe storms at different seasons. There is a large traffic on it between Chicago and the lower lake ports. The Straits of Mackinac are usually free from ice between May 1st and December 1st. The best harbors are at Little Traverse Bay and at Grand Haven on the E. shore. Chicago, near its head, has an indifferent harbor, and the same may be said of those of Milwaukee and Sheboygan on the W. side.

Michigan, University of, coeducational institution at Ann Arbor, Mich.; established by the legislature, 1837; opened 1841. To the original academic institution a medical department was added, 1850; a law department, 1859, and subsequently an engineering department, a school of pharmacy, a homeopathic medical college, and a dental college, and the citizens of Detroit erected a fine observatory on the grounds, 1854. The department of literature, science, and the arts embraces regular courses of four years and a graduate course. The university had (1910) 317 professors and instructors, 4,755 students in all departments, about 270,000 volumes in the library, scientific apparatus valued at nearly \$1,400,000, grounds and buildings nearly \$3,000,000, and productive funds over \$300,000.

Michipicoten (mish-i-pi-kō'tèn), name of a river, harbor, bay, and island in or emptying into Lake Superior, and forming parts of Ontario. The river is the outlet of many lakes, and descends through them by a series of rapids and cascades into the Bay of Michipicoten. It has clear and abundant water, except in

summer; abounds in trout, sturgeon, and other fish, and forms with Moose River a boat route from Lake Superior to Hudson Bay, over at least thirty-nine portages. It requires sixteen days to reach Moose Factory, at the mouth of Moose River. At the mouth of Michipicoten River was the Michipicoten House of the Hudson Bay Company—one of its largest fortified posts, established at an early date. Fifty m. SW. is the Island of Michipicoten, 25 m. long E. and W. by 10 broad, rocky, inhabited, cut up by firds on the S. side, culminating in an elevation of about 800 ft. above the level of the lake. It has inexhaustible supplies of native iron.

Michmah (mīk'māsh), town of Palestine; in the tribe of Benjamin; 9 Roman m. N. of Jerusalem; was a point of great strategical importance; played a conspicuous part in several of the wars of the Israelites (1 Sam. xiii, xiv; Isa. x, 28); became the seat of government under Judas Maccabæus (1 Macc. ix, 73), and is now a small village.

Michoacán (mē-chō-ā-kān'), state of Mexico, bounded by Colima, Jalisco, Guanajuato, Querétaro, Mexico, Guerrero, and the Pacific Ocean; area, 22,874 sq. m.; pop. (1900) 930,033; capital, Morelia. The state is abundantly watered; has been called the "garden of Mexico" from the fertility of its soil; is largely engaged in cattle raising; and mines gold, silver, and copper.

Mi'crobes, minute living beings, instrumental in the production of fermentation and decay, and of many contagious diseases affecting man and the lower animals. See BACTERIA; GERM THEORY OF DISEASE.

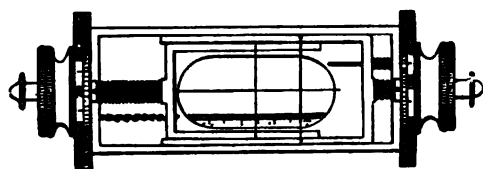
Micrococcus, general name applied to minute spherical bacteria, many of which produce diseases in plants and animals. The name is also applied to a particular genus of the spherical bacteria. See BACTERIA.

Mi'crocosm, name applied by the astrological philosophers of the Middle Ages to man, who was conceived of as the epitome or miniature representation of the universe, which was named by them *Macrocosm*, or the great world.

Microfarad (mī-kro-fār'ad). See FARAD.

Microm'eter, an apparatus for measuring small distances. The term is usually limited to an instrument applied to telescopes and microscopes for measuring minute spaces and objects. One of the earliest micrometers was constructed by a Mr. Gascoigne in England abt. 1640, and used by him to measure the diameter of the moon. It employed a movable wire. The instruments now in use under the name of the filar micrometer, constructed on the same principles, may be briefly described as follows: Two forks are moved in a plane perpendicular to the axis of the telescope by means of fine micrometer screws. Each of these forks has stretched across it a spider's web which is placed in the focus of the objective. These webs are parallel, and being made to embrace any object, as the disk of a planet or the distance between two stars, the number of turns of the screws, which may be read by graduated

circles, will indicate the space measured, the value of a revolution of the screws having been ascertained by the time occupied by a known star in passing from one line to the other when placed at the distance of a certain number of revolutions, or by the measurement of some known space. Another web is stretched across the center of the field, perpendicular to the other two. The position of these lines



MICROMETER.

may be revolved about the axis of the telescope by means of an endless screw.

Fraunhofer's suspended annular micrometer is much used for objects, such as comets, faint stars, and asteroids, which will not bear the illumination necessary to render visible the lines in a filar micrometer. There are other forms of micrometers for special uses. A method for taking the positions and distances of stars, double or in clusters, is to photograph the telescopic field on glass, and then to measure the impression with a micrometer. This is very accurate, and possesses many obvious advantages.

Microne'sia, general name given to the small islands E. of the Philippines. The Caroline and Marshall islands, each embracing a great number of smaller groups, are the principal divisions.

Mi'crophone, device for increasing the amplitude of the minute sound waves received by the telephone and thus to intensify the effect in the telephonic receiver. The name is generally applied to apparatus in which the change in the electrical resistance of graphitic carbon with varying pressure is utilized. Numerous forms of the microphone have been described, of which the carbon button invented by Edison has come into general commercial use in telephonic transmission.

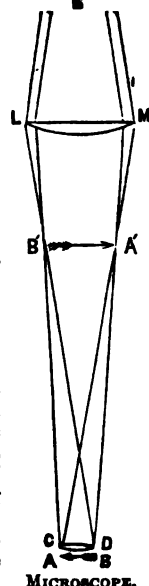
Mi'croscope, optical instrument for the examination of minute objects. Microscopes are of two kinds, simple and compound. With the former, the object is viewed directly either by means of a single lens or a set of lenses employed in the same manner as a single lens. With the latter, an enlarged image of the object is formed by a single lens or a set of lenses, termed the object glass or objective; this image is viewed and further amplified by means of an eyepiece or "ocular." Each form is valuable in its place, but as a general instrument of research the compound form, with the modern improvements, is superior. The invention of the simple microscope is not claimed by anyone, but that of the compound has been disputed; it is claimed by the Italians and the Dutch, but theirs was much inferior to the improved instruments of the present

day. In the simple microscope several lenses may be used, but they all act as a single glass; in the compound microscope there are two parts, the object glass, which may be a single lens, and the eyepiece or ocular, and this can also be a single lens.

The object glass C D forms an enlarged and inverted image A' B' of the object A B and the eye glass L M receives the diverging rays from this image, as if from an object, and brings them to the eye at E, so that the object appears greatly magnified, on the same principle as the simple instrument.

The magnifying power can be varied by changing the power of the objective, of the eyepiece, and by altering the distance between object and object glass, eye glass and object glass. By approaching the object to the objective, and moving the ocular to a greater distance from the object glass, the image is increased in size; and, conversely, by increasing the distance from object to object glass, and lessening that between the latter and eye glass, the image is reduced in size. In order that a greater portion of the object may come within range of the eyepiece, and so be made visible, a third lens is placed between the objective and the eye glass. As the third lens limits the circle of light or field of view which is seen in looking into a microscope, it is called the *field glass*. The eye glass and field glass together are considered as one, and termed eyepiece or ocular. The Huyghenian is the most usual form of eyepiece.

Microscopical objects are examined on plates of glass 1 in. by 3 in., and covered with a disk or square of thin glass; this cover is for the purpose both of protecting the object and of preventing the formation of moisture or deleterious vapors from reaching the exposed portion of the objective. Objectives are named according to their magnifying power. There is no uniform system on which the lenses are constructed. In Great Britain and the U. S. lenses are called 1 in., $\frac{1}{2}$ in., $\frac{1}{4}$ in., etc. On this principle it is supposed that 10 in. is considered the standard for distinct vision, and therefore the 1-in. object glass would produce an image at 10 in. distance enlarged 10 diameters, the $\frac{1}{2}$ in. (at the same distance) 20 diameters, the $\frac{1}{4}$ in. 40 diameters, etc. Lenses made in France and Germany are named according to an arbitrary system adopted by the maker. The eyepieces of American and English manufacture receive the letters of the alphabet to distinguish them; the A eyepiece magnifying 5 diameters; B, 10; C, 15, etc. Hence the 1-in. objective with A eyepiece gives a power of 50 diameters; $\frac{1}{2}$ in., 100 diameters. Low-power objective glasses are those of longer focus than the $\frac{1}{2}$ in.; medium, $\frac{1}{4}$ th, $\frac{3}{8}$ th, and $\frac{1}{2}$ th; high, from $\frac{3}{8}$ th to $\frac{1}{4}$ th, which is about the highest.



Microscopy, use of the microscope and the preparation of objects to be examined by it. Perhaps the greatest use of the microscope which has been made in recent years is in the recognition during life of bacteria, and in this way diagnosing disease. Thus in the case of consumption the earliest proof of the presence of the disease may be obtained by the examination of the expectoration and the detection in this of the tubercular bacilli. Of scarcely less importance is its use in the examination of the urine and other secretions of the body. It has also an important part to play in medical jurisprudence, especially in the examination of stains for the presence of blood. The microscopic examination of meat for parasites, such as the trichina, and the detection of adulteration in fabrics and foodstuffs are some of the important industrial uses of the microscope. In the examination of the tissues of the body they may either be torn apart with needles and the cells examined, or they may be divided into very thin sections, and these sections examined. The sections are prepared on an instrument called the microtome. Tissues are stained in many ways to bring out peculiarities of structure, for some parts take up stains while other parts remain uncolored.

Midas, common name among the Phrygian kings; Herodotus mentions three. One of them, a son of Gordias by Cybele, was a pupil of Orpheus, promoted the worship of Dionysus, and became the center of a number of popular myths. Thus, Dionysus gave him the power of transforming everything he touched into gold; but the gift proved a terrible curse. The man would have starved to death had not the god helped him a second time. By bathing in the river Pactolus the auriferous power was transferred from the body of Midas to the waters of the river, and they became henceforth productive of gold. Another time he was chosen umpire in a musical contest between Apollo and Pan. He gave the prize to the latter, and the angry god punished him by changing his ears into those of an ass. Midas concealed the deformity under a Phrygian cap, but one of his slaves happened to discover the secret. Unable to keep it to himself, and yet not venturing to tell it to anybody, the slave dug a hole in the soil, whispered the secret down into the hole, and covered it up with earth; but the reeds which grew on the spot always sang when the wind blew among them, "Midas has ass's ears."

Mid'delburg, capital of the province of Zeeland, Netherlands; on the island of Walcheren; 4½ m. NE. of Flushing; is a handsome town, and has many public squares and interesting buildings, among which the townhall is the most remarkable, built by Charles the Bold, 1468, and ornamented with twenty-five colossal statues of counts and countesses of Flanders. The town is mentioned in the middle of the twelfth century, and received its charter, 1225. The brilliant point in its history is the defeat of the Spaniards, 1574, after a siege of two years. The wars between France and Great Britain in the beginning of the

nineteenth century nearly ruined the town. Pop. (1899) 16,000.

Middle Ages, term generally used to designate that historical period lying between the ancient and modern epochs of the world's civilization, and separating them from each other. Concerning the exact date of the beginning and end of the mediæval period differences of opinion exist, some authors regarding the triumph of the Franks over the remnants of the Roman power in Gaul at the battle of Soissons (486 A.D.), others the overthrow of the W. Roman Empire, 476 A.D., and still others the accession of Charlemagne, 768 A.D., or the dissolution of the Frankish Empire, 843 A.D., as the opening events. Some consider the discovery of America, others the discovery of printing, most the German Reformation, and a few the Westphalian Peace (1648), as marking the close.

Those historians who consider ancient history to comprehend the world's history down to the dissolution of the Roman state begin the Middle Ages with the overthrow of the Roman power by the Germans and the settlement of the Vandals, Goths, Anglo-Saxons, Franks, and Burgundians on Romanic soil in the latter half of the fifth century; while those who regard Teutonic history in its more specific light, and consider each nationality as having its own childhood, youth, manhood, and old age, are inclined to look on the life of the Teutonic peoples down to the dissolution of the Frankish European Empire as the period of their wardship, and hence to set the beginning of the following period of young manhood or middle age between the years 814 and 843 A.D.; while, as regards the boundary of the epoch on the other side, very nearly all are agreed that the great events of the fifteenth and sixteenth centuries—*vis.*, the discovery of printing, the discovery of America, the employment of gunpowder, the development of the absolute monarchy in the state, and the Reformation in the Church—designate the point where the spirit of civilization was throwing off its mediæval and taking on its modern form.

Middle C, in music, the note standing a fifth above the F or bass clef and a fifth below the G or treble clef. Its place is therefore on the added line between the bass and treble clefs. It takes its name from this circumstance, and also from its midway position on the general scale. The C clef, whether placed on the third, fourth, or any other line, is always representative of the note or sound called "middle C," and the lines and spaces above and below are named accordingly.

Mid'dlesborough, borough in county of York, England; at the mouth of the Tees; 50 m. N. of York; has very important iron and steel works and considerable exports of coal, besides shipyards, chemical works, salt and soda works, wire, nail, and tube works, marine engineering works, sawmills, and manufactures of ropes and sailcloth. It is a municipal, parliamentary, and county borough. Estimated pop. of municipal borough (1908) 103,511.

Mid'dleton, Thomas, abt. 1570-1627; English dramatist; b. probably London; was associated with Jonson, Fletcher, Massinger, and Rowley in the composition of several plays. "A Mad World, my Masters," "The Mayor of Queenborough," and "The Roaring Girl" are in Dodsley's collection. His "Game at Chess," based on Prince Charles's unsuccessful wooing of the Spanish infant, performed in 1624, gave offense to the court.

Mid'dletown, city in Orange Co., N. Y.; on the Wallkill River; 24 m. WSW. of Newburg; is in an agricultural and dairy region; is the seat of the New York Hospital for the Insane; and has railroad machine shops, manufacturing of woollen hats, wood type, Russia leather, sheet steel, shirts, blankets, and condensed milk, Thrall Hospital, and Middletown Academy. Pop. (1910) 15,313.

Midge, name applied in England to several dipterous insects resembling gnats and mosquitoes in their habit of feeding on the blood of men and animals. In the U. S. the name is especially given to the wheat midge, *Cecidomyia tritici*, a most destructive insect, which lays its eggs in the blossoming ears of wheat.

Midhat' Pasha', 1822-84; Turkish statesman; b. Constantinople; early entered the public service; became Governor General of Bulgaria, 1864, and subsequently of Bagdad; and was successively President of the Council of Justice and Grand Vizier. He resumed the latter post, 1876, as leader of the war party; promoted the deposition of Abd-ul Aziz and the promulgation of the new constitution (December 23d); and was the Turkish representative at the conference of the great powers in Constantinople, the propositions of which were rejected, January 20, 1877. Early in February he was suddenly dismissed and banished; but soon after was made Governor of Smyrna, and then of Syria. In 1881 he and several other pashas were accused of murdering Sultan Abd-ul Aziz. At the trial he was convicted and condemned to death, but on the representations of Great Britain this sentence was commuted to imprisonment for life.

Mid'ianites, nomad or half-nomad people of N. Arabia, who in the time of the early history of the Hebrews dwelt in the vicinity of the Arabian Gulf and Dead Sea, especially between Mt. Sinai and Moab. They are derived in Scripture from Midian, the son of Abraham by Keturah. Gideon seems to have broken their power by his great victory over them and their allies, the Amalekites.

Mid'rash (Hebrew "explanation"), general name for the Talmudical writings of the Jews, including both the Halacha and the Haggada, together constituting a large body of literature. The word Midrash occurs in the Bible (II Chron. xiii, 22, 24, 27). The Book of Chronicles itself, when compared with the books of Samuel and Kings, is a sort of historical Midrash.

Mid'riff. See DIAPHRAGM.

Mid'shipman, lowest grade of officers in line of promotion to the naval service. In the U. S. midshipmen must be graduates of the Naval Academy at Annapolis, where they pass six years as cadet midshipmen. On graduation they take rank in the order of merit. After two years of sea service and the passing of an examination they may be promoted to ensign. When on sea duty the pay is \$800 a year. In the British navy, after five and a half years of service and the passing of an examination, they may be promoted to rank of lieutenant, with the pay of £34 4s. a year. The French *aspirants de marines* perform duties similar to those of midshipmen.

Mid'way Is'land, U. S. possession, in the Pacific Ocean, 1,800 m. N. by W. of Honolulu. There are, within an atoll, two islands and two islets. The largest, Sand Island, has an area of 1½ sq. m. and is 12 ft. above sea level, with one point over 40 ft. The flora consists of grass and bushes. Wells yield good water, and fish and game birds abound. The American Pacific cable stretches from San Francisco to Honolulu, thence to Midway Island, thence to Guam, and thence to the Philippines. The station on Midway has a colony of eighteen persons, and receives a monthly mail.

Mif'lin, Thomas, 1744-1800; American military officer; b. Philadelphia, of Quaker stock; became a merchant; 1772-73, was in the legislature; went to Congress, 1774; joined the Revolutionary army; rose to be major general, 1777, serving with great honor; resigned after the battle of Germantown; was sent to Congress, 1782, becoming its president, 1783; speaker of the state legislature, 1785; was in the convention of 1787 which formed the U. S. Constitution; President of the Pennsylvania Executive Council, 1788-90; governor, 1791-1800.

Mig'dol (Hebrew, "watchtower"), locality mentioned (Ex. xiv, 2, etc.) as near the place where the Israelites crossed the Red Sea. The word indicates the necessity of guarding a ford where a shallowing of the water due to natural causes rendered the land liable to incursions by predatory bands from the East. The existence of a Migdol (Magdolum) on the Roman itinerary N. of the middle of the Isthmus of Suez gave nearly all of its probability to the now exploded theory of the Exodus route proposed by Brugsch Bey.

Mignet (mèn-yâ'), François Auguste Marie, 1796-1884; French historian; b. Aix; studied law at the Academy of Aix at the same time with Thiers; removed to Paris, 1822; produced a dissertation on feudalism and the institutions of St. Louis; then followed "Histoire de la Révolution Française," "Histoire de Marie Stuart," "Vie de Franklin," "Antonio Perez et Philippe II," "Charles Quint, son abdication, son séjour et sa mort au monastère de Yuste"; "Elbges Historiques," and other works; 1830-48, director of the archives of the Foreign Ministry; member of the Institute and of the Academy, and commander of the Legion of Honor, etc.

Mignonette (mīn-yūn-ēt'), popular name of an herb, sometimes half shrubby; a native of N. Africa; universally cultivated for its deli-



MIGNONETTE.

cious fragrance. Its botanical name is *Reseda odorata*, and it belongs to the order *Resedaceae*.

Migraine (mī-grān'), **Me'grim**, or **Hemicra'nia**, paroxysmal headache, usually one sided, with nausea and disorders of vision. The disease is often hereditary, and usually begins in youth. It is most frequent in women and the neurotic. It is noteworthy that many celebrated men have suffered from it. Often no cause can be found, but it is quite frequently dependent on eye strain, disorders of the uterus and ovaries, adenoid growths, and diseased conditions of the nose. The attacks are precipitated by certain foods, by emotional excitement, and sometimes apparently without cause. In the simplest form there is one-sided headache with nausea, followed by vomiting and relief. In some patients remarkable visual phenomena precede an attack. There may be simple blurring of vision, subjective flashes of light, or bright zigzag lines (fortification spectra). More rarely there are distinct illusions of animals, as dogs and cats, or even distinct landscapes.

Mikado (mī-kā'dō), title usually applied by foreigners to the hereditary ruler of Japan. It is, however, rarely heard in Japan itself, having passed away with the abolition of the feudal system. Mikado denoted first the imperial court, and then, by a common Oriental figure, it passed over to the person of the emperor. The Japanese prefer to use the title of Tenshi (i.e., "Son of Heaven"), or Kotei, the Japanese equivalent of Chinese Hwang-ti, or imperial ruler, as more in harmony with the modern system of government.

Miklosich (mīk'lō-sīch), **Franz von**, 1813-91; founder of Slavic philology; b. Luttenberg, Styria; 1848, was elected to the Reichstag; 1850-86, was Prof. of Slavic Philology at Vienna; 1862, was made life member of the Reichsrath; chief works, "Lexicon of the Old

Slavonian Language," "Comparative Grammar of the Slavonian Languages," "On the Dialects and the Wanderings of the Gypsies of Europe."

Milan (mē'lān) I, 1854-1901; King of Serbia; b. Jassy; son of Milosch Yephremovitch; succeeded his cousin Prince Michael III as Prince Milan IV, 1868; assumed the reins of government when eighteen years old; declared war against Turkey, was ignominiously defeated, and only saved from loss of territory by Russian intervention; aided Russia in her war with Turkey, 1877-78; and secured recognition of the independence of Serbia by the Treaty of Berlin. In 1882 Serbia declared itself a kingdom, and he took the title of Milan I. On the union of E. Rumelia and Bulgaria (1885) he invaded Bulgaria, but was expelled and his army defeated. He abdicated, 1889, proclaiming his son Alexander king under a regency; later renounced his rank and nationality, and died in Vienna.

Milan (mī'lān), ancient *Mediolanum*, capital of province of same name, and second city in size of Italy; in the valley of the Po; 75 m. ENE. of Turin; is connected by navigable canals with the Adda, and, through the Ticino, with the Po, and by rail with all the large cities and towns of Italy. The streets generally are broad and clean; the palaces, though sometimes of immense size, lack the mediæval grandeur of those of Florence. The city is the seat of an archbishopric, and is celebrated for its fine churches, of which there are about eighty. The cathedral, an Italian Gothic structure, begun 1366, is one of the most splendid temples in the world, being exceeded in size only by St. Peter's and the Cathedral of Seville. Near Santa Maria del Grazie, in which are very interesting frescoes, etc., is the convent containing that ruined masterpiece of art, Leonardo da Vinci's "Last Supper." The Brera Gallery contains more than 400 oil paintings, many of great excellence, besides admirable frescoes, etc. In the same building are an archaeological museum and the National Library, founded, 1764, with 250,000 volumes. The famous Ambrosian Library, founded by Cardinal Borromeo, has risen to 185,000 volumes, besides about 10,000 manuscripts, some of the greatest rarity. The adjoining Gallery of Art contains, among its countless treasures, invaluable original drawings and manuscripts by da Vinci. In addition to public collections, Milan has twenty-six private picture galleries. There are fifteen museums of natural history, fourteen of medals and antiquarian objects generally.

The schools, academies, musical conservatories, etc., have a high reputation. The theater La Scala is the second largest in Italy and one of the largest in Europe. The public gardens and the Bastione di Porta Venezia furnish charming promenades, and the drive through the Corso and around the walls is most agreeable. Among the noted edifices in the city should be mentioned the Victor Emmanuel Gallery, or arcade. This gallery is entered from the Piazza della Scala through a superb Corinthian arch of granite, extends to the

Piazza del Duomo, and contains about 100 brilliant shops. The geographical position of Milan secures it an immense inland trade, chiefly in grain, rice, cheese, silk, and cotton; it also exports much country produce. It is the chief financial and banking center of Italy, and has very important manufactures of silks, velvets, woollens, gloves, machinery, art furniture, and porcelain.

Ancient Mediolanum, the chief town of the Insubres, passed to the Romans about 222 B.C. Cicero and Marcus Brutus were afterwards among its governors, and in the third century it almost rivaled Rome. It was Christianized very early, and was made illustrious in the fourth century by the great St. Ambrose. After many vicissitudes, in the eleventh century it became once more independent and had a population of 300,000. Its moral and intellectual prosperity rose with its material wealth. After this followed a series of disastrous wars, ending with the destruction of the city by Frederick Barbarossa, 1162. It was, however, rebuilt, and, 1176, the Milanese, aided by the neighboring towns, defeated Frederick at Legnano. In 1227 they were once more crushed by Frederick II. The so-called Golden Ambrosian Republic, of three years' duration, was followed, 1450, by the dukedom of the Sforza, which lasted till 1500. From that time Milan continued for the most part under a foreign yoke, French, Spanish, or German, until 1796, when Napoleon made it the capital of the Cisalpine Republic. In 1814 the Austrians took possession of the city, but several insurrections occurred, and a state of chronic conspiracy existed until the "Glorious Five Days' Revolution," 1848, which terminated in the expulsion of the Austrians. On June 8, 1859, Milan welcomed the Franco-Italian army within her gates. Pop. (1901) 493,241.

Milanés y Fuentes (mē-lān-ās' ō fwēn'tēs), José Jacinto, 1814-63; Cuban poet; b. Matanzas; was successively a clerk, blacksmith's assistant, and railway secretary; published lyrics and several plays, including the tragedy "El Conde Alarcos," one of the best dramatic works of Cuban authorship. After Heredia, he is the most popular of the Cuban poets.

Milazzo (mē-lāt'sō), ancient, *Mile*, seaport in province of Messina, Sicily; on the Gulf of Milazzo; about 27 m. W. of the city of Messina; exports, oil, wine, salt fish, linseed, dried fruits, etc. Milazzo, or Mile, was founded by the Zancle more than seven hundred years before our era. Here, 1860, Garibaldi obtained a brilliant victory over the Neapolitan troops, followed by the surrender of the fortress of Milazzo and the city of Messina. Pop. (1901) 16,422.

Mil'dew, various minute fungi, especially those which are injurious to crops. One of the most widely disseminated mildews is that which attacks the grape vine, called *Oidium tuckeri*. It appears as grayish spots on the under surface of the leaves, the young shoots, and the stems of the fruit; it often destroys the foliage, and consequently the fruit fails to ripen. In this country grape growers generally

use sulphur at the first appearance of the trouble. Its efficacy is well established, provided it be applied in time. Rose growers are



FIG. 1.—GRAPE-VINE MILDREW.

sometimes great losers by mildew; this is attributed to a different plant from that upon the grape, *Spherotheca pannosa*. A similar blight comes upon hop vines, often seriously



FIG. 2.—PEA MILDREW.

(Leaflet natural size. Fungus magnified.)

affecting the crop. Cucumbers, lettuce, and other vegetables are injured in a similar manner in unfavorable seasons; and in this country a late crop of peas is almost impossible by rea-

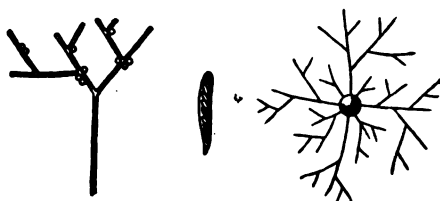


FIG. 3.—PAPER MILDREW.

son of a mildew which covers the foliage in such abundance that the plants appear as if dusted with a white powder.

Mile, name for a great number of lineal measures, each remotely derived from the Roman mile. Among the principal miles are:

English and U. S. statute mile.....	= 1.
Roman mile.....	= .9193
English nautical or geographical mile.....	= 1.153
German, four English nautical miles.....	= 4.611
Scotch mile.....	= 1.127
Irish mile.....	= 1.273
German short mile.....	= 3.897
German long mile.....	= 5.753
Prussian mile.....	= 4.680
Danish mile.....	= 4.684
Swedish mile.....	= 6.648

The geographical mile is one minute of the earth's equator. Our statute mile was fixed in Queen Elizabeth's time at 5,280 ft., and has not since been changed.

Miles, Nelson Appleton, 1839-; American military officer; b. Wachusettville, Mass.; entered the volunteer service as captain, 1861; was distinguished at Fair Oaks and Malvern Hill; appointed, 1862, colonel Sixty-first New York Volunteers, which he commanded at Fredericksburg; brigadier general, 1864; distinguished in the Richmond campaign; major general of volunteers, 1865; colonel of the Fortieth U. S. Infantry, 1866; transferred to the Fifth Infantry, 1869; major general, 1890; commanded several military departments, and suppressed a number of Indian outbreaks; was in command of the U. S. troops in Chicago during the riots, 1894. On October 5, 1895, he assumed command of the army; during the war with Spain, 1898, commanded the expedition which invaded Porto Rico, and on the reorganization of the army, 1901, was promoted to lieutenant general. He was reprimanded for publicly expressing satisfaction with Admiral Dewey's favorable report on Admiral Schley, 1901; retired, 1903; author of "Personal Recollections," "Observations Abroad," "Military Europe."

Miletus, city of Ionia, on the Sinus Latmicus, opposite the mouth of the Meander; existed as a town when the Greeks planted their first colonies in Asia Minor; but on the arrival of the Ionians under Neleus all the male citizens of the ancient population (Carians or Leleges) were massacred. Miletus soon became one of the most powerful maritime and commercial places of the Mediterranean. It formed a great number of prosperous colonies, such as Abydos and Lampsacus on the Hellespont, Cyzicus on the Propontis, Sinope and Amisus on the Euxine, and others in Thrace, the Crimea, and on the Borysthenes. After its unsuccessful revolt against Persia in 500 B.C., under Histieus, its strength was broken. Darius treated it with great severity. Most of the inhabitants were massacred, and the rest were transported. The place was then given up to the Carians. During the Peloponnesian War, it threw off the Athenian yoke; afterwards attempted to resist Alexander the Great, and continued a place of commercial consequence until destroyed by the Turks. Its site is now occupied by Balat or Palattia.

Mil'ford Ha'ven, harbor of Pembrokeshire, Wales; the deepest, safest, and most commodious in Great Britain; formed by an inlet of St. George's Channel, NW. of the entrance to Bristol Channel. It is about 10 m. long and from 1 to 2 m. wide, and is defended by two batteries. It has substantial docks and piers; is a great resort for shipping, and is engaged chiefly in shipbuilding. Pop. (1901) 5,102.

Mil'bau (mē-yō') See MILLAU.

Milicz (mē'lich) of Kremsier (krēm'zēr), abt. 1325-74; Bohemian reformer; one of the most influential precursors of Huss; b. Kremsier, near Olmütz, Moravia; took holy orders, 1350; was made Canon of the Cathedral of St. Vitus, Prague, 1360, and in the same year accompanied Charles IV to Germany as secretary; resigned all offices, 1363, and soon after returned to Prague, where he preached to the

poor people in the streets—not in Latin, but in Bohemian, a remarkable innovation. In 1367 he went to Rome to confer with the pope on the subject of needed reforms in the Church, but an attempt to preach on the presence of Antichrist was frustrated by the Inquisition, and he was imprisoned for a time. In 1369-72 he again preached in Prague, but having been accused of heresy was summoned to Avignon, when he acquitted himself.

Mil'itary Acad'emy, U. S. See UNITED STATES MILITARY ACADEMY.

Mil'itary Insign'ia, badges, such as shoulder straps and epaulets, and other devices used as distinguishing marks of military rank and service. Details of some of these for the U. S. services are given here:

The Army.—The gold letters U. S. (except for the corps of engineers, which are silver) are worn on each side of the collar of the officers' undress coats, with distinctive insignia as follows: Adjutant general's department, a gold shield; inspector general's department, a gold sword and fasces crossed and wreathed; judge advocate general's department, a gold sword and pen crossed and wreathed; quartermaster's department, sword and key crossed on a wheel surmounted by a spread eagle; subsistence department, a silver crescent; pay department, a diamond in gold; medical department, a modification of the cross of the Knights of St. John, in gold; corps of engineers, a silver-turreted castle; ordnance department, shell and flame, in gold; signal corps, two crossed signal flags and a burning torch, of gold; record and pension office, a silver trefoil upon a gold wreath. The cavalry, artillery, and infantry are designated by devices showing the number of the regiment at the intersection of two crossed weapons in gold—sabers for the cavalry, cannon for the artillery, and rifles for the infantry.

The rank devices on the shoulder straps are: For the general, two silver stars, with the arms of the U. S. in gold between them; lieutenant general, three silver stars; major general, two stars, and brigadier general, but one star; colonel, a silver spread eagle; lieutenant colonel, two silver leaves; major, two gold leaves; captain, four silver bars; first lieutenant, two silver bars; second lieutenant and additional second lieutenant, a plain strap; chaplain, a plain Latin cross.

The color of the straps corresponds with the color of the facings, which are as follows: General officers, dark sky blue (khaki uniform only); infantry, white (except of the khaki uniform, sky blue); cavalry, yellow; artillery, scarlet; engineer troops, scarlet piped with white; ordnance troops, crimson piped with white; post quartermaster sergeants, buff piped with white; commissary sergeants, gray piped with white; sergeants of the signal corps, black piped with white; hospital corps, emerald green.

The rank of noncommissioned officers is marked by chevrons, with various devices symbolic of their offices. All enlisted men who have served for one term wear on both sleeves a diagonal half-chevron of gold lace,

or, in case of hospital corps, a stripe of emerald green. The "service-in-war" chevrons are piped with color of the proper division. Corps badges, such as a winged horse foot for the cavalry, a circle over "I" for First Corps, etc., are worn. The division of the corps is represented by the color of the symbol; worn on the hat by enlisted men and on the left breast by officers, as follows: First Division, red; Second Division, white; Third Division, blue.

The Navy.—The line of the navy is distinguished by the foul anchor. The other devices used are: For the medical corps, a spread oak leaf of dead gold, with a silver acorn; for the pay corps, a silver oak sprig; for the construction corps, a gold sprig of two oak leaves and an acorn; for professors, one silver oak leaf and an acorn; for civil engineers, the letters C. E. in silver.

The grade is indicated in a general way by variations in the width of the strip of navy gold around the top and down the front of the collar. The same general distinction is brought out in the sleeve ornaments and also on the cocked hat, that of the admiral and rear admiral having a strip of gold lace around the outer rims of the fans, while that of the other officers has a strip of black silk lace.

The shoulder straps bear the following rank devices, the admiral's being also distinguished by their greater size: For the admiral, four silver stars, with a gold foul anchor under each of the two outer stars; for rear admirals, two similar stars, with a silver foul anchor in the center; for captains, a silver spread eagle, with two silver foul anchors; for commanders, two silver oak leaves and a silver foul anchor; for lieutenant commanders, two gold oak leaves, with a silver foul anchor; for lieutenants, four silver bars, with a silver foul anchor; for lieutenants, junior grade, two silver bars, with a silver foul anchor; for ensigns, a silver foul anchor; for naval cadets, a gold foul anchor.

Embroidered collar devices are worn on the frock coats of the less important officers, such as chief boatswains, two foul anchors, crossed, embroidered in silver; chief gunners, a flaming spherical shell, in silver; mates, a binocular glass, etc. All petty officers wear on the outer garment a rating badge, consisting of a spread eagle above a scarlet class chevron—those of the starboard watch on the right arm and those of the port watch on the left arm.

Specialty marks, watch marks, and continuous service marks are worn by the enlisted men.

Military Law. See COURT-MARTIAL; MARTIAL LAW.

Militia, that portion of the military strength of a nation enrolled for discipline and instruction, but local in its organization, and engaged in active service only in cases of emergency. Originally the term was synonymous with the cognate derivative "military," as embracing the whole body of national troops, whether embodied for actual service or relegated to industrial pursuits. It is the organized national reserve in contradistinction to the regular army

and the *levée en masse* of a country, and therefore comprehends the "volunteer" organizations of Great Britain and the U. S., the National Guard of France, the Landwehr and Landsturm of Germany, and similar organizations in the other European states.

In Great Britain alone, of the European states, is reliance placed on voluntary enlistment for maintaining the various militia organizations in time of peace, and for recruiting the regular army both in peace and war. The militia system established, in its essential features, at the Restoration was abolished by the "Territorial and Reserve Forces Act" of 1907. The "auxiliary forces" of the earlier system, which included militia, yeomanry and volunteers, were superseded by the "territorial army," the cavalry and infantry of which represent the old yeomanry and volunteer organizations. The militia ceased to exist as such, and the majority of the militia battalions were converted into reserve battalions of the regular army. All men of reserve units, whether originally militiamen or directly recruited, are enlisted as "special reservists" of the regular army; they are partially trained in time of peace and are available for transfer to the army in war. For the territorial army recruitment is entirely voluntary. The annual training in camp varies from eight to fifteen days. The administration of the territorial army is vested in "County Associations," which undertake the raising, equipment and maintenance of the force. The special reserve, 1910-1, numbered 86,539, of whom 70,486 were effectives; and the territorial force 315,408, of whom 274,188 were effectives.

The militia of the U. S. consists of two classes: the organized militia, or National Guard, and the reserve militia. The organized militia is not Federal, but belongs to the various states and territories of the Union. Enlistment in the organized militia is voluntary, and the term of service usually three years. By act of U. S. legislature, which became a law, May 27, 1908, the President, who is commander in chief of the militia of the several states when called into the actual service of the U. S., is empowered to call out the militia for service either within or without the borders of the U. S., at his pleasure, so that the National Guard can be called into national service, without in any way being changed as regards its state duties. At all other times the respective governors are the commanders in chief; while employed in the U. S. service, these troops receive the pay, rations, etc., of regular soldiers, and are subject to the Articles of War. The total strength of the National Guard is about 118,000 officers and men, about three fourths of whom could actually be put in the field. The reserve, or unorganized militia, comprises, with certain exemptions, the whole of the manhood of the nation between the ages of eighteen and forty-five, all legally liable to serve, for a period of two years, in case of a national need, and reported as exceeding 11,000,000. In addition to this force the U. S. had (1911) a naval militia organized in 23 states and the District of Columbia, comprising 602 officers and 6,592 en-

listed men. Each state, etc., having a naval militia has a vessel of the navy assigned to it to promote practical training. See ARMY; NATIONAL GUARD.

Milk, secretion of the mammary glands which supplies the natural nourishment for the young of all mammals. Under normal conditions it is an opaque, white liquid, often tinged with yellow or blue. It is heavier and more viscous than water, and, when fresh, has a faint, pleasant odor and an agreeable, sweetish taste. Human milk is nearly always alkaline, and milk from carnivorous animals acid. In a short time milk becomes decidedly acid, owing to the conversion of milk sugar into lactic acid. All milks, from whatever source, have the same general properties and contain the same proximate principles, the only difference found between milks from races or from different individuals of the same race being caused by slight variations in the proportion of the constituents. Of the various mammals whose milk is used for food in different parts of the world may be mentioned the goat in the hilly districts of Europe, the buffalo in India, the llama in S. America, the camel in desert countries, and the mare on the steppes of Russia and central Asia. Sheep's milk is used in some countries for making cheese and in other ways, and the milk of reindeers is commonly used as food in the Arctic regions.

Cows' milk, on account of its importance as human food and because it has been more thoroughly studied than any other, will be considered as typical of all milks. It is white or yellowish white, the yellow tint being imparted by the butter fat, as closely skimmed milk has a bluish-white, opalescent appearance. A highly colored milk is characteristic of some breeds of cows, especially the Guernsey, and to a somewhat less extent the Jersey, the intensity of the color varying considerably with individual animals of all breeds. The color is affected by the food and by the period of lactation, it being more marked when cows are in good pasture than when they are fed dry fodder, and higher in the earlier stages of lactation than toward the end. Its specific gravity ranges from about 1.028 to 1.038, according to the amount and character of the solids which it contains; the average is about 1.032.

Under the microscope milk is a transparent, colorless liquid, in which are suspended an immense number of yellowish, translucent globules having a high refractive power and a pearly luster. They constitute the fatty portion of the milk, and vary greatly in size, the diameter ranging from about .001 mm. for the smallest to about .01 mm. for the largest; the average diameter is about .004 mm. The number gradually increases, and at the same time the size diminishes, as the period of lactation advances, there being usually two to four times as many at the end of the lactation period as at the beginning. The yield of milk depends chiefly on the individual characteristics and the breed of the animal, and is influenced by age of cow, period of lactation, and food. The average yield of dairy animals throughout the U. S., including all breeds and all conditions of

treatment, is between 3,000 and 4,000 lb. per year. The Holsteins lead all other breeds in quantity of milk produced. The Ayrshires are also heavy milkers. With proper care the yield of milk increases as the cow grows older, until seven or eight years old, when a maximum is reached. The greatest flow is usually obtained within a few weeks after calving, and then gradually diminishes until the end of lactation.

Butter fat is a mixture of several neutral fats or glycerides (glycerol salts or ethers of fatty acids). Nine fatty acids have already been obtained by the saponification of butter fat. The acids found in butter, in combination with glycerol, are oleic, palmitic, stearic, butyric, caproic, caprylic, capric, myristic, and butic. The first five mentioned are the most important. The solids not fat in milk consist of protein matter (casein and albumen), milk sugar, and salts (ash), with minute quantities of other organic compounds (galactin, lactoglobulin, urea, creatin, fibrin, cholesterin, and citric acid). The solution of the solids not fat in water constitutes the milk serum. Of these constituents the most uniform in its proportions is the sugar, but this may be materially increased by the use of saccharine food, as is found in feeding cows on carrots and beets. The sugar of milk is crystallizable, but it is less sweet and less soluble in water than cane sugar. When milk is exposed to a warm temperature it ferments, and lactic acid is generated, which has the same ultimate composition as sugar of milk. Under certain conditions the vinous fermentation may now take place, the sugar of milk be converted into grape sugar, and a spirituous liquor be produced, such as is obtained by the Tartars.

Nearly all the changes in milk which cause it to become unsuitable for food are caused by the growth of microorganisms, the germs of which are introduced into the milk after it is drawn. Scrupulous cleanliness may reduce their number, but even with the greatest care it is impossible to exclude them entirely from the milk used for domestic purposes. These germs multiply rapidly in milk, and within a few hours, or at most within a few days, according to the conditions under which it is kept, the original properties of milk become entirely changed. The most common change is that known as souring, manifested by an acid taste and coagulation of the casein. There are several kinds of organisms that produce this change, which consists in the transformation of the milk sugar into lactic acid. Only a portion of the sugar is changed in this way, as the development of the organisms is hindered by the acid formed, and ceases entirely when the acid amounts to about 1 per cent. Milk that has undergone lactic fermentation has been recommended as more healthful than fresh milk, on the ground that it prevents the growth of noxious bacteria in the intestines, and thus prolongs life by freeing the system of their poisons. Other organisms produce different changes, such as slimy, ropy, and bitter milk, as well as numerous taints. As it is impossible to exclude germs from milk, it is necessary, in order to preserve it unchanged for even a few hours, either to provide conditions which

are unfavorable to the growth of organisms or to destroy them before the milk has become unsuitable for food.

Nearly if not all of these organisms grow most rapidly at temperatures between 30° and 40° C. (86°-104° F.), decreasing rapidly as the temperature falls, and ceasing at the freezing point; at temperatures below 4° C. (40° F.) there is very little change. This suggests that the most practical way of keeping milk from day to day, or where fresh supplies cannot be obtained at frequent intervals, is to cool it to as near the freezing point as possible. A large demand has grown in cities for milk that has been heated in closed vessels to temperatures ranging from 65° to 80° C. for a sufficient time to kill the organisms contained in it; the best results are obtained when the milk is reheated twenty-four to forty-eight hours after the first heating, the jars being kept closed. This is called sterilized, or Pasteurized, milk. Such milk will keep without undergoing the usual fermentations to which milk is subject so long as the cans containing it are kept closed and access of germs prevented; it will, however, soon sour after the cans are opened. Certain antiseptics, among them boracic acid, borax, and salicylic acid, have been used for the preservation of milk for domestic purposes. All such substances interfere more or less with the action of the digestive organs, and usually aggravate diseases of the kidneys; their use is not to be recommended, and under no circumstances should milk preserved in this way be used as food for infants or invalids. The use of the antiseptics mentioned has been prohibited in France and Germany, and very generally condemned by boards of health everywhere.

Condensed milk is prepared by evaporating milk at low temperatures in a vacuum to about one third of its original volume. Cane sugar is usually added to the milk after it is condensed. Inclosed in air-tight cans, it may be kept indefinitely. Diluted with about two parts of water, it is the best substitute for fresh milk. The aroma of butter and the characteristic flavors of the different varieties of cheese are due to changes in the constituents of milk brought about by the action of certain species of bacteria. It is therefore important that milk and cream for dairy purposes be kept under conditions favorable to the growth of bacteria which contribute to the best results. Very successful experiments in butter making have been made by introducing pure cultures of these bacteria into the cream and allowing them to develop before churning. In Denmark some large creameries have been operated on the plan of first sterilizing the cream by heat and then introducing the desired culture. Butter of superior quality is being made in this way. See BUTTER; CHEESE.

Milk Fe'ver, name applied to a short febrile attack which sometimes attends the beginning of the milk-secreting process, a few days after childbirth. It is unimportant except as sometimes simulating the onset of puerperal fever, for which it is occasionally mistaken. Farmers and veterinarians apply the name to puerperal peritonitis of the lower animals, and to a se-

vere form of cerebro-spinal meningitis which sometimes attacks cows after calving.

Milk Leg, obstruction of the veins and lymphatics, causing a painful swelling in one or both lower extremities; its usual cause being septic infection after parturition, but it sometimes occurs in unmarried women and in males. The attack may commence with a chill, and within twenty-four or thirty-six hours the foot or lower part of the leg may begin to swell, the process extending upward. The limbs usually remain useless for many months, and often never recover their former condition.

Milk Sick'ness, acute disease endemic in sparsely settled parts of the U. S.; affecting cattle primarily, and human beings as a result of eating the flesh or drinking the milk of affected cattle. In cattle it is called *trembles* and *slows*. The symptoms in cattle are marked muscular weakness, tremor, vomiting, and a peculiar fetor of the breath. In man the disease comes on suddenly and presents similar symptoms. Fever, coated tongue, fetor of breath, and vomiting, with profound weakness, are the characteristics.

Milk Sug'ar, or *Lac'tin*, one of the constituents of milk. It is prepared in Switzerland as a vehicle for medicines and as food for infants in teething, being less apt to produce acidity than cane sugar. The crystals of sugar of milk are collected and decolorized by animal charcoal and repeated crystallizations. They are hard and gritty, rather insoluble in water and alcohol, slightly sweet, and not easily fermentable.

Milk Tree. See COW TREE.

Milk'weed, popular name of the *Asclepiadaceæ*; a large group (1,700 species) of milky-juiced dicotyledonous herbs, shrubs, and trees, with opposite leaves, gamopetalous flowers,



VARIEGATED MILKWEED.

free bicarpellary ovaries, and mostly united stamens. They are widely dispersed, especially in the warmer portions of the earth. In the U. S. there are about 100 species, more than half of which (the common milkweeds of fields

and lowlands) belong to the genus *Asclepias*. The most showy of native U. S. milkweeds is *A. tuberosa*, more generally called butterfly weed and pleurisy root; it is quite common, especially in the South; the root is large, fleshy, and white; it bears numerous umbels of bright, orange-colored flowers; in this species the juice is scarcely milky. It is used in medicine, the root being the official portion; its action is diaphoretic and expectorant without being stimulant, and in large doses is purgative.

Milky Way. See GALAXY.

Mill, James, 1773-1836; Scottish philosopher; b. Logie Pert, Forfarshire; was licensed in the Scottish National Church, 1798, but abandoned that career in consequence of a change of religious opinion; settled in London, 1802, as an author; edited *The Literary Journal*; became intimately connected with Jeremy Bentham, residing in his house and expounding his opinions to the English public; wrote an elaborate "History of British India," which procured him an important place in the office of the East India Company; was one of the chief contributors to *The Westminster Review*; published a treatise on "Political Economy," and a remarkable philosophical work, "An Analysis of the Phenomena of the Human Mind."

Mill, John Stuart, 1806-73; English philosopher, logician, and political economist; b. London; son of the preceding; at the age of eight read Herodotus, Xenophon, and Plato; when about fourteen spent a year in France, and there was influenced by Continental liberalism; on his return studied law, but at seventeen entered the service of the East India Company, in which he remained thirty-five years, rising to its highest post, that of examiner of the India correspondence. In 1823 *The Westminster Review* was established by Bentham and his followers as a radical organ in politics and religion, and in this Mill published most of his literary efforts for many years, also being, 1835-40, its principal conductor. When only twenty-one he edited Bentham's great work, "On Evidence," adding notes and supplementary chapters of his own. His "System of Logic, Ratiocinative and Inductive" (1843) made him prominent as a bold, radical writer on philosophical subjects. This work embodied the peculiarities of empirical philosophy and association psychology. In 1848 he published his full treatise, "Principles of Political Economy," and, 1859, "On Liberty" which strikes at the despotism of public opinion over individual freedom of thought. Mill was elected to Parliament, 1865, and was prominent in advocating the measure to admit women to the suffrage, which failed. In the new election he was defeated and retired from public life. His other writings include: "Considerations on Representative Government," "Utilitarianism," "Auguste Comte and Positivism," "Examination of Sir William Hamilton's Philosophy," "England and Ireland," "The Subjection of Women," "Chapters and Speeches on the Irish Land Question." His "Autobiography" appeared after his death, and the "Three Essays

—Nature, the Utility of Religion, and Theism," 1874.

Mill. See GRINDING AND CRUSHING MACHINERY.

Millais (mil-lä'), Sir John Everett, 1829-96; English portrait, genre, and landscape painter; b. Southampton; studied in the Royal Academy, London, where, 1843, he won a silver medal for his "Pizarro Seizing the Inca of Peru," and a gold medal, 1847, for his "Benjamites Seizing the Daughters of Shiloh"; became a Royal Academician, 1863; created baronet, 1885; won a second-class medal at the Paris Exposition of 1855; medal of honor at the Exposition of 1878; made officer of the Legion of Honor, 1878; member of the Institute of France, 1883. In 1847-48 he formed one of the small group of British painters called the Pre-Raphaelites, but he did not long adhere to their theories of art. He was the leading portrait painter in London, and some of his pictures, such as "A Huguenot," "Yes or No," and "Effie Deans," achieved a widespread popularity. He succeeded Lord Leighton as president of the Royal Academy, 1896.

Millen'arians, or Chliasts (kil'i-ästs), those who hold that the second advent of Christ precedes the end of the world, and that at his coming the pious dead will be raised and will reign with him on the earth for a thousand years, the millennium of Rev. xx, 1-7.

Millen'ium, or Chil'iasm, period of the Messiah's reign on earth supposed to be taught in Rev. xx, 1-7. There are two theories on this subject: (1) The literal, according to the Jewish form of which, as taught first 200 years B.C., the Messiah shall reign in Jerusalem, and the Jews restored to Palestine shall enjoy remarkable and continuous prosperity; and in its Christian form, the so-called Chliasm, Christians no less than Jews shall share these temporal blessings with the Jews. (2) The spiritual theory declares that the number 1,000 is used in Scripture as denoting an indefinite large number. So the thousand years of Rev. xx, 1-7, is not to be taken literally, but as figurative of that long period of spiritual prosperity which the Church shall enjoy before the coming of Christ and the end of time.

Miller, Cincinnatus Heine, better known as JOAQUIN MILLER, 1841-1913; American poet; b. Wabash District, Ind.; 1864, went to Willamette Valley, Ore., and soon after to the California mining regions. In 1860 was admitted to the bar in Oregon; 1863, edited the Eugene *Democratic Register* for a short time; 1866-70, was district judge of Oregon; settled in New York abt. 1874, and in Oakland, Cal., 1887. He wrote "Songs of the Sierras," "Pacific Poems," "Songs of the Sun Lands," "Unwritten History," "The Ship in the Desert," "First Families of the Sierras," a novel; "Adrianne, a Dream of Italy," "One Fair Woman," a novel; "Songs of Italy," "Shadows of Shasta," "The Gold-seekers of the Sierras," "Songs of the Mexican Seas," "The Danites," a novel, successfully produced as a play.

Miller, Hugh, 1802-56; Scottish geologist; b. Cromarty; worked as a stone mason, 1819-36; traveled extensively through Scotland during this period and carefully studied its geological features. In 1840 he went to Edinburgh as editor of *The Witness*, and it was in the columns of this paper he first published "The Old Red Sandstone, or New Walks in an Old Field," which made a great sensation not only on account of the important geological discoveries it contained, but also by its exact reasoning. He also published "First Impressions of England and its People," "Footprints of the Creator," "My Schools and Schoolmasters," "Testimony of the Rocks," etc. His denial of the universality of the deluge and of the literal meaning of the word "day" in the first chapter of Genesis aroused much suspicion among his coreligionists; on the other hand, his assertion that the entire type of organic being was changed by each geological period did not escape the sneers of the scientists.

Miller, Joaquin. See **MILLER, CININNATUS HEINE.**

Miller, Joseph, best known as JOE MILLER, 1684-1738; English comedian; b. probably London; was somewhat celebrated for his ready wit. A book of jests under his name, supposed to be the compilation of John Mottley, was published, 1739, and made "Joe Miller" a generic term for an old joke.

Millerites, sect founded by William Miller (1782-1849), who announced, 1831, the speedy second coming of Christ, which, by his interpretation of the biblical prophecies, he fixed for the year 1843, at which time the world would be destroyed. In a few years his converts in the U. S., Canada, and Great Britain numbered many thousands, and were popularly known as Millerites, though they styled themselves Second Adventists.

Miller's Thumb, or River Bull-head, small fish of the cold streams and lakes of N. Europe. Its scientific name is *Cottus gobio*. It lies quiescent on the bottom among stones, making a quick spring when disturbed. It is very destructive to the eggs of trout.

Millet (mê-yâ'), Aimé, 1819-91; French sculptor; b. Paris; became famous, 1857, by his "Ariadne," which was purchased by the government. His subsequent productions include "Apollo," in the Grand Opera House, and a monument of Baudin in Père Lachaise.

Millet, Jean François, 1814-75; French genre and landscape painter; b. Gréville, Manche; brought up on a farm; became a pupil of Mouchel and Paul Delaroche; first exhibited at the Paris Salon, 1840; settled in Barbazon, 1849; had long struggle with poverty; paintings failed of appreciation till near end of his life; now command high prices; masterpieces, "The Angelus" (brought \$100,000 at auction in Paris) and "The Gleaners" (in the Louvre); other works, "The Sower," "The Water-carrier," "The Grafter," "The Turkey-keeper" (all in New York), "The Churner," "Buckwheat Threshers," "The Planters" (all in

Boston), "Breaking Flax" (Baltimore), and "Death and the Wood-cutter" (France).

Mil'let, name given to grasses of several distinct species and genera. The true millet of ancient and modern agriculture is *Panicum miliaceum*. It has a strong stem, 2 to 4 ft. high, with a profusion of foliage; its abundant flowers are in large, open, nodding panicles, and the plant resembles a miniature broom corn; the seeds afford a nutritious flour.

Mil'kens Bend, village of Madison Parish, La.; on the Mississippi River, 15 m. above Vicksburg, Miss. In June, 1863, near this place, a Confederate force of 2,500, under Gen. H. McCullough, attacked a body of colored troops, numbering 1,400, and part of an Iowa regiment, under Gen. E. S. Dennis, but with the assistance of gunboats from Admiral Porter's fleet they were repulsed.

Mills, Clark, 1815-83; American sculptor; b. Onondaga Co., N. Y.; first trade was that of a millwright, second that of a plasterer, from which he proceeded to sculpture, which he began to practice in Charleston, S. C.; was self-taught, had never been in Europe or seen the works of the masters in his art. His first work was a bust of John C. Calhoun, which the city of Charleston purchased and placed in the townhall, 1846. This led to other portrait busts of local celebrities. In 1848 he was invited to furnish the design for an equestrian statue of Andrew Jackson for the Government. The result was the statue on Lafayette Square, near the White House, in Washington, chiefly remarkable for the poise of the horse on its hind legs. The next performance was the colossal statue of Washington at the battle of Princeton, also in Washington, unveiled 1860. The casting of his colossal statue of "Liberty," after Crawford's design, for the dome of the Capitol, was finished 1863.

Mills, Samuel John, 1783-1818; father of American foreign missions; b. Torrington, Conn. In 1808, while he was a member of Williams College, he took part in the formation of a society "to effect, in the persons of its members, a mission or missions to the heathen." This was the first foreign missionary organization in America. Afterwards at Andover (1810), in connection with Messrs. Judson, Nott, and Newell, he presented a memorial to the General Association of Massachusetts, which led directly to the formation of the American Board of Commissioners for Foreign Missions. The American Colonization Society, organized, like many other societies, chiefly through his influence, sent him and the

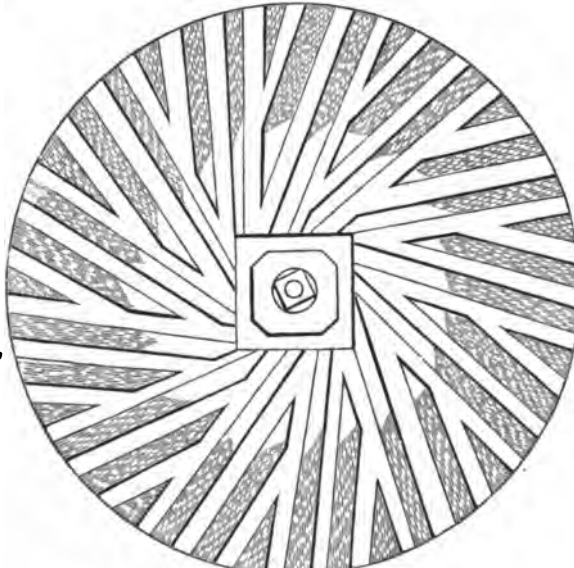


MILLET
(*Panicum miliaceum*).

Rev. Ebenezer Burgess to Africa to select a site for a colony. Mr. Mills died on the return voyage.

Mill Springs, village of Wayne Co., Ky.; on the Cumberland River. During the Civil War, on January 19, 1862, the Federal troops, 28,000 strong, under Gen. George H. Thomas, and the Confederate troops, 10,000 strong, under Gen. George B. Crittenden, met in battle about 5 m. from this place. The latter were led by Gen. Felix K. Zollicoffer, who was killed, and his forces defeated with a loss of 190 killed, 60 wounded, and 89 prisoners. Of the Federal force 38 were killed and 194 wounded.

Mill's stone, hard and rough stone in one or many pieces, cylindrical, from 3 to 7 ft. in diameter and 8 to 18 in. thick, used together with another of the same size and shape for grinding grain. The lower stone is firmly fixed



MILLSTONE.

in its bed. The upper one is suspended over this so as to revolve with its lower face exactly parallel to the upper face of the lower stone. The best millstones are made of buhrstone, but hard granite is sometimes used, and also millstone grit.

Millstone Grit, geological formation at the commencement of the coal period, principally a conglomerate, composed of flinty sand and small pebbles; it is also called grit rock and grindstone grit. It is named from the frequent use to which it is put, particularly in England. In Virginia the formation sometimes reaches 1,000 ft. in thickness, and the rock is mainly a sandstone, but contains heavy beds of conglomerate. In Alabama it is a quartzose grit of great thickness. The millstone grit formation extends over parts of some of the S. counties of New York, having a thickness of from 20 to 60 ft.

Mil'man, Henry Hart, 1791-1868; English author; b. London; became Prof. of Poetry at Oxford, 1821; Bampton lecturer, 1826; and Dean of St. Paul's, 1849. His works include "Fazio," a tragedy performed successfully; "Samor, Lord of the Bright City, an Heroic Poem," "The Fall of Jerusalem," a dramatic poem; "History of the Jews," "History of Christianity from the Birth of Christ to the Abolition of Paganism in the Roman Empire," and "History of Latin Christianity." He prepared a sumptuous illustrated edition of Horace, an annotated edition of Gibbon's "Decline and Fall of the Roman Empire," and other works.

Mil'more, Martin, 1844-83; American sculptor; b. Sligo, Ireland; removed to Boston, 1851; modeled an alto-relief of an ideal subject entitled "Phosphor"; made busts of Sumner, Longfellow, Ticknor, and other citizens; received, 1864, a commission to execute granite statues of Ceres, Flora, and Pomona for the Horticultural Hall at Boston; designed, 1867, a bronze statue for the Soldiers' Monument at Forest Hill Cemetery, Roxbury, and subsequently was employed by the city of Boston to execute the Soldiers' and Sailors' Monument on Boston Common.

Milne-Edwards, Henri, 1800-85; French naturalist; b. Bruges, Belgium; became Prof. of Natural History at the Lycée Henri IV; Prof. of Natural History at the Musée, 1841; Prof. of Zoölogy, 1862; Dean of the Faculty of Sciences; member of the academies of Sciences and of Medicine; commander of the Legion of Honor, etc.; author of "Anatomical Researches Concerning Crustaceans," "Handbook of Materia Medica," "Elements of Zoölogy," "Natural History of Crustaceans," new edition of Lamarck's "Natural History," and of a great number of valuable scientific papers.

Milo (mí'lō), flourished abt. 510 B.C.; athlete of Croton, Italy; son of Diotimus; was one of the most noted

athletes of antiquity, having won the prize as wrestler in six Olympian, seven Pythian, ten Isthmian, and nine Nemean games. He was distinguished for his appetite also; at Olympia he lifted and carried on his shoulders a four-year-old ox across the race course, then slew and ate it on the same day. He met his death by trying to split with his hands a log that had been opened by wedges. The wedges fell out, his hands were caught in the log, and he was torn to pieces by animals.

Milo (mē'lō), Greek island; one of the Cyclades; 14 m. long from E. to W. and 8 m. from N. to S.; 63 m. E. from Peloponnesus. Entirely volcanic, it is crescent shaped, the vast crater forming an excellent harbor. It is rich in sulphur, vitriol, and alum. The celebrated statue called "The Venus of Milo," now in the Museum of the Louvre, was dug up

here by a peasant, 1820, and was acquired by the French Govt.

Mil'rea, or Milrec, Portuguese and Brazilian coin and money of account. The Portuguese milrea is worth about one U. S. dollar; the Brazilian is 51½ cents of the money of the U. S.

Miltiades (mil-ti'ā-dez), Athenian statesman of the fifth century B.C.; was a nephew of the elder Miltiades, the founder of a despotism in the Thracian Chersonese. He was sent out abt. 516 to take possession of his uncle's inheritance. His only achievement during his stay in the Chersonese was the conquest of Lemnos and Imbros, which drew on him the hostility of Darius, and he was driven out abt. 493. When the Persian armament under Datis and Artaphernes was approaching Greece he was elected one of the ten generals of Athens, and achieved the most memorable victory in the history of Greece. At his request a fleet of seventy ships was intrusted to him, the destination of which was known only to himself; sailed to Paros to gratify a private animosity; and ravaged the island, but failed to capture the town. On his return he was condemned to pay a penalty of fifty talents, and soon after died. His son Cimon afterwards paid the fine.

Mil'ton, John, 1608-74; English poet; b. Chapeaside, London; son of a scrivener; was reared in a family of Puritan cast; educated at Christ's College, Cambridge; lived, 1632-37, at Horton, Buckinghamshire, whither the family had retired on an independency, and there wrote "L'Allegro," the "Sonnet to the Nightingale," "Il Penseroso," "Lycidas," "Comus," and "Arcades." In 1638 he visited Leyden, Paris, and Rome; 1639, returned and settled in London; there published, 1641-42, five attacks on the Established Church, including "Of Prelatical Episcopacy" and "Apology for Smectymnuus" (a controversial tract by several authors), and, 1644-45, four tracts on divorce, in which he maintained that moral incompatibilities justify it. He married, 1643, Mary Powell, who left him after one month on account of the "sparse diet and hard study" she found in his house; but later they were reconciled, and she bore him three daughters.

Milton published, 1644, two essays: "On Education" and "Areopagitica, a Speech for the Liberty of Unlicensed Printing," the latter is considered his most eloquent piece of prose writing. After the execution of Charles I, 1649, he wrote three powerful pamphlets to defend the acts of the English people in its struggle with the king: "The Tenure of Kings and Magistrates," "Eikonoclastes," and "Pro Populo Anglicano Defensio," the last in answer to a defense of the king by Claude de Saumaise of Leyden; "Defensio Secunda" appeared 1654. Appointed secretary in the Ministry of Foreign Affairs by Cromwell, 1649, he held the place till the Restoration, 1660, though he became entirely blind, 1654, and had to depend on a reader and a scribe. His wife having died, he married, 1656, Catharine Woodcock,

who died 1658, and, 1663, Elizabeth Minshull, but his home was not a happy one. "Paradise Lost" was published 1667; "History of Britain," 1670; "Paradise Regained" and "Samson Agonistes," 1671; "Of True Religion," 1673; "De Doctrina Christiana," which shows his heterodoxy in religious matters, was not published till 1825.

Milwau'kee, capital of Milwaukee Co., Wis.; on Lake Michigan; 80 m. N. of Chicago; is on a bay running inland about 3 m., stretching 6 m. from headland to headland, part of which has been converted by the U. S. Govt. into a harbor of refuge for the Great Lakes by the erection of huge breakwaters. The Milwaukee River flows through the main portion of the city almost due S. till it nears the lake, when it turns abruptly SE.; other rivers within the city are the Menomonee and the Kinnickinnic. Trade is greatly facilitated by the fact that the rivers and canals admit the largest vessels with good dockage at the doors of the warehouses. Milwaukee is a city of wide streets and commanding views, while in its residence part it is remarkable for its fine shade trees and spacious lawns, and the absence of fences gives it the appearance of one large park. Public parks aggregating nearly 600 acres, on the lake shore, Milwaukee River, and other portions of the city and suburbs.

The notable buildings include the County Courthouse (cost \$4,100,000), City Hall (\$1,000,000), U. S. Govt. building (\$1,500,000), Public Library and Museum (\$600,000), Industrial Exposition building (\$300,000), Layton Art Gallery, Union and Chicago and Northwest Railway stations; among churches, the Cathedral of St. John (Roman Catholic), St. Paul's and St. James's (Protestant Episcopal), Immanuel (Presbyterian), St. Josephat (Roman Catholic), Church of Gesu (Jesuit), and Trinity (Lutheran); among charitable and educational institutions, Emergency Hospital, Home for the Friendless, State Normal School, Convent of Notre Dame (mother house in the U. S.), Concordia College (Lutheran), Marquette College (Roman Catholic), Milwaukee-Dower College for Women (nonsectarian), and Seminary of St. Francis de Sales (Roman Catholic). The city is the seat of a Roman Catholic archbishopric and a Protestant Episcopal bishopric, and has a large number of charitable and benevolent institutions. In the vicinity is a National Soldiers' Home.

According to the U. S. census of 1909, the city had 1,764 "factory-system" manufacturing plants, operated on a capital of \$219,391,000, and yielding products valued at \$208,324,000; the industries including the manufacture of iron, steel, and machinery, leather, clothing, beer, knit goods, stoves, tinware, and furnaces, car building, iron and steel, furniture, malleable iron, brick, and meat packing. The sewers emptying into the rivers at one time were sources of disease, but tunnels have been constructed from the lake to points on each of the three rivers that furnish the city's dockage, and now the water of the rivers is kept pure by being flushed continually from the lake.

Juneau, the French fur trader, came here, 1817, when the locality was a Pottawattomie

Indian village. Milwaukee was founded 1835; chartered as a city, 1846; owes its rapid development and present prosperity in a very large degree to its German citizenship. Pop. (1910) 373,857.

Mime (mīm), development of the Sicilian farce. The word is still used as a synonym for an actor on the mimic stage. In its special application the mime represents the imitation of a definite situation or a typical character, and differs from the antique comedy of the early period by the lack of a chorus and the lack of an elaborate plot.

Mim'icry, the general act of imitation. The word is used in several more technical senses.

MIMICRY IN BIOLOGY.—Biologists recognize under this phrase a great class of cases of close resemblance in form, color, or habits, between insects or animals, and even between these and inanimate objects, which serve to render these creatures indistinguishable by friend or foe. In their coloration, insects—butterflies are a notable example—take on the colors of various flowers, leaves, mosses, etc., and thus avoid detection; or the colors of poisonous insects, and so share their immunity; or the shape of harmless knots, twigs, etc., and so escape attention; or the colors of conspicuous things, and so attract their mates and victims. The phenomena, of which these instances are only examples, fall thus into two classes—*protective mimicry*, the animal escaping his enemies by these organic subterfuges, and *aggressive mimicry*, the animal deceiving others thus to support himself and to destroy his enemies. Taken together the facts furnish a convincing proof of the evolution process; for no explanation is adequate except that afforded by the law of natural selection.

MIMICRY IN PSYCHOLOGY.—In psychology the term is applied to all cases of imitation of one being by another in which the mental state of the imitator is in a measure involved. There is (1) *expressive mimicry*, referring to all the facts of organic pantomime by which one creature expresses himself by gestures, movements, etc., which another understands and responds to. It is probable that the imitations of monkeys, parrots, etc., had their origin in such a common tendency to become gregarious by getting rudimentary forms of expression, the original movements being useful either to the individual or to the flock. Men show the same tendency to pantomime, as is seen clearly in idiots, imbeciles, and diseased persons. The loss of this gesture imitation is called *animia* by the pathologists. Looked at theoretically as a kind of imitation, it is nearest the biological type. (2) *Conscious mimicry*, ordinarily called "conscious imitation." It applies to the fact of an innate tendency to imitate movements, actions, etc., seen early in infants. (3) *Social mimicry*, the tendency universal and binding upon all, to act, believe, think, dress, etc., as custom, habit, and social life dictate. These influences are summarized under the phrase "social suggestion."

Mimir (mē'mīr), Scandinavian god of wisdom; most celebrated of the giants. The Va-

ner, with whom he was left as a hostage, cut off his head. Odin embalmed it by his magic art, pronounced over it mystic runes, and ever after consulted it on critical occasions.

Mimner'mus, Greek poet, called the Colophonian; b. in Smyrna; flourished from abt. 634 to 600 B.C. He set his poems to music, fixed the form of elegiac poetry, and has been called its inventor. The most important fragment is his celebrated poem "Nanno," the oldest erotic elegy of Greek literature.

Mimo'sa, name of a genus of leguminous trees, shrubs, and herbs which gives name to the great subfamily *Mimoseæ*, distinguished by having regular flowers. The genus includes at least ten species which have decidedly sensi-



SENSITIVE PLANT (*Mimosa pudica*).

tive leaves. Of these, the *Mimosa pudica* is the most remarkable, and the only one familiar in cultivation. Most of the numerous species are tropical, many are African, many American, of which no less than fifteen occur in the U. S.

Mina (mī'nā), in Greek money and weights, a standard equivalent to 100 drachmæ and forming the sixtieth part of a talent. The value varied according to the talent used. The Attic mina is generally stated to have been worth \$17.61 U. S. money; it was a money of account, and was not coined.

Mina Bird, member of the starling family (*Sturnidæ*) common in S. India; scientific name *Gracula religiosa*; is about 10 in. long, of a glossy purplish black, with a white patch on the primaries. A curious wattle on each side of the head, back of the eye, is orange colored; the gill and feet are yellow. It is very lively and intelligent, and when trained is considered the best talker among the birds, far surpassing any parrot. It is also a good singer.

Min'aret, slender, lancelike shaft of brick or stone which rises from close outside one of the corners of a Mussulman mosque. It termi-

notes far above the roof in a tapering cone, and is ascended from inside by a very narrow spiral staircase. At varying heights it is surrounded by one or more projecting galleries, whence the muezzin, protected by a parapet or railing, calls to prayer.



MINARET.

Minas Geraes (mē'nās zhē-ris'), state of Brazil; bounded by Bahia, Espirito Santo, Rio de Janeiro, São Paulo, Matto Grosso, and Goyaz; area, 221,951 sq. m.; pop. (1900) 3,594,471; capital, Ouro Preto.

Mincio (mīn'chō), river of Italy which issues from the S. extremity of Lake Garda, passes by Mantua, and joins the Po 8 m. below the city of that name after a course of 50 m.; is navigable for barges from its union with the Po to Mantua; its waters are much used for irrigation.

Mind (mīnt), Gottfried, 1768-1814; Swiss painter; b. Bern; better known as **BERNER FRIEDLI**; was ignorant and deformed, but was called the Raphael of cats, his pictures of which are much sought. He also excelled in painting bears, children, and beggars.

Mind. See **MEMORY**; **REASON**; **THOUGHT**; **WILL**.

Mindanao (mēn-dā-nā'ō), second largest of the Philippine Islands; bounded N. by the Sea of Mindanao, Negros, Cebu, Bohol, and Leyte; E. by the Pacific Ocean; S. by the Pacific Ocean, Celebes Sea, and Sulu Archipelago; W. by the Sulu Sea; shore line, 1,592 m.; area, 36,292 sq. m.; pop. (1903) 499,634, of whom 246,694 were civilized; number of dependent islands, 264, of which Basilan, Dinagat, Siargao, Samal, Camiguin, Olutanga, Saccol, and Sarangani are the most important. The main island has been subject to the eruption of volcanoes (Apo, 10,312 ft. high; Malindang, 8,560) and the destructive action of earthquakes; is drained chiefly by the Grande de Mindanao and the Butuan rivers; has large mineral and forest wealth, but undeveloped; and is chiefly engaged in raising livestock and hemp. The island is divided into seven provinces, of which Misamis and Surigao were given civil government, 1901. Mindanao was the first of the Philippines seen by Magellan, 1521.

Mind Healing. See **CHRISTIAN SCIENCE**; **PSYCHOTHERAPY**.

Min'den, town in province of Westphalia, Prussia; on the Weser; 40 m. W. of Hanover; is an old town, closely built, with few open places or interesting buildings. The Roman Catholic church, however, has a tower which dates back to the eleventh century, and illustrates the first stage in the development of the Gothic spire. The town was formerly strongly fortified, and has been the scene of some hard fighting; now the place of its fortifications is occupied by manufacturing suburbs; has manufactures of soap, chemicals, glass, tobacco, beer, brandy, and hosiery. Pop. (1900) 24,327.

Mindoro (mēn-dō'rō), one of the Philippine Islands, lying a little N. of the center of the entire archipelago; bounded N. and E. by Luzon, SE. by Panay, W. by Mindoro Strait; coast line, 322 m.; area, including twenty-six dependent islands, 4,108 sq. m.; pop. (1903) 39,582, of whom 32,318 were civilized. The natives are of Malayan stock, with a few Visayans. The coasts are indented with a number of fine bays and harbors. There are few roads, the inland villages being reached by mountain trails or in canoes if accessible by river. Road travel is by sleds or rude carts drawn by buffaloes. All the towns (nineteen) are along the coast; the villages of the interior are inhabited by wild tribes. The former large production of rice gave the island the name of "the granary of the Philippines," and a supposed abundance of gold gave the Spanish name from Mina de Oro, or "mine of gold." Present industries are connected with rattan, sago, forest gums, wax, tortoise shell, balao oil, pitch, and honey.

Mind Read'ing. See **MUSCLE READING**; **TELEPATHY**.

Mine. See **MINING**.

Mineral'ogy, the science which treats of the chemical and physical properties, relations, occurrence, and classification of minerals; the word *mineral* meaning any homogeneous, inorganic, natural product, not gaseous, and not the immediate result of organic processes. A mineral may be the indirect and altered product or organic life, like coal, which results from the alteration of wood, or amber, which is an altered vegetable resin; but fossil bones, shells, etc., are not classed as minerals. Minerals are determined by their chemical properties, form, structure, luster, color, hardness, specific gravity, etc. **Chemistry.**—The exact composition of a mineral is ascertained by quantitative analysis; the nature of its constituents by qualitative analysis, the blowpipe reactions being especially useful in determining minerals, from their simplicity and certainty. Every one of the elements occurs in the mineral kingdom, and a mineral may consist of one element or of a combination so complex that no present system of chemical notation will give a satisfactory representation of its composition.

Form and Structure.—Some minerals occur only in an amorphous state, never showing any signs of crystallization, but the majority are well crystallized or distinctly crystalline. A distinction is made between crystallized and crystalline minerals, the latter not showing free or partially individual crystals. If a crystalline mineral does not even show recognizable individuals it is called *cryptocrystalline*. Crystalline minerals are classified, according to their structure, into *granular*, *lamellar*, *scaly*, *radiated*, and *fibrous*. Any crystal can be referred to one of seven systems, in which the crystal faces are determined by their position in regard to a set of resumed axes intersecting within the crystal. In six of these systems there are three axes and in one of them four. **Luster, Color, and Translucency.**—Minerals are divided according to

their *luster*, or appearance in reflected light, into *metallic* and *nonmetallic*, and the nonmetallic again into adamantine, vitreous, greasy, pearly, silky, and lusterless or earthy. *Color* is always the same, and characteristic in the case of some minerals, as metals, the sulphides, certain metallic oxides, and salts; others are white or colorless and transparent, like ice, quartz, many silicates, etc., but these may be colored by mechanical admixture or isomorphous combination of colored constituents. The colors of minerals vary greatly, and so does their translucency, the native metals and minerals with metallic luster being generally quite opaque, even in very thin films.

Cleavage.—The tendency to split in certain directions is characteristic of most crystallizable minerals, and is of great use in determining minerals, the cleavage planes being always the same for the same mineral, no matter what the modifications of the crystal. *Fracture* differs from cleavage in not being parallel to fixed planes. It is classified as conchoidal, even and uneven, according to the shape, and smooth, splintery, earthy, and hackly (like broken copper), according to the nature of the resulting surface. *Hardness*.—Minerals vary in hardness, from the liquid hydrocarbons and water to the diamond. Hardness varies little for the same mineral, and is a valuable aid in determining minerals. Its degree is ascertained by reference to the following scale, beginning with the softest: 1, talc; 2, gypsum; 3, calcite; 4, fluorite; 5, apatite; 6, orthoclase; 7, quartz; 8, corundum; 9, diamond. A mineral scratched easily by apatite, and easily scratching fluorite, would be fixed at 4.5. *Specific gravity* is confined to narrow limits in its variations for the same minerals, and is of importance in distinguishing them. *Phosphorescence* is induced in some minerals, as diamond and calcined barite, by exposure to daylight; in others, as topaz and fluorite, by warming, by electricity, or by mechanical disturbance, as pressure, cleaving, etc. The *taste*, *smell*, and *feel* of minerals are additional means of distinguishing them. See METALS; METALLURGY.

Min'eral Wa'ters, waters such as contain unusual quantities of various salts in solution, or sometimes simply very pure water. In the latter case they are not properly called mineral waters. Springs that are found in localities where soluble substances occur in the earth are likely to contain some of these substances in solution. Such natural solutions have long attracted the attention of mankind, and are used medicinally to an enormous extent, under the impression that they have curative powers that are not possessed by solutions of the same kind made artificially. Mineral waters are classified into (1) *thermal waters*; (2) *common salt or muriated saline waters*; (3) *alkaline waters*; (4) *sulphated saline waters*; (5) *iron or chalybeate waters*; (6) *sulphur waters*; (7) *earthy and calcareous waters*; (8) *alum waters*.

Mineral Wool, or **Sil'icate Cot'ton**, threadlike filaments which have the appearance of wool or cotton when massed together; produced by

the action of steam or air under pressure on vitreous or scoriaceous substances when in the molten state. As an article of commercial value the material first came into use 1871, it having been produced in that year at Osnabruck, Germany. The production of it in the U. S. began about four years later, and subsequently in England. In the various processes of smelting ores of metals the compressed air necessary to accelerate combustion sometimes escapes from the furnaces through the tapping hole or tuyeres in such a way as to separate the cinder into shotlike particles, which in tearing themselves from the fluid stream draw out threads of various length and fineness. The slag of blast furnaces is the cheapest and most abundant substance which can be utilized for the manufacture of the article. As a general thing, the color of mineral wool is white. The fibers of mineral wool act as a medium to prevent the circulation of the air; which being accomplished, the passage of heat is retarded. By reason of its porosity the material also forms a most effective barrier to the transmission of sound. The indestructible character of the fibers makes mineral wool available for all purposes of insulation.

Min'ers. See SAPPERS.

Min'er'va, called by the Greeks ATHENA, PALLAS, or PALLAS ATHENE, one of the principal divinities of Greek and Roman mythology. Jupiter's first spouse was the goddess Metis; but an oracle having declared that her son would snatch the supremacy away from his father, Jupiter swallowed Metis and her unborn child. When the time of birth arrived, Jupiter felt a violent pain in his head, and in his agony requested Vulcan to cleave the head open with an ax; whereupon Minerva sprang forth, according to the later accounts, in full armor, and with a mighty war shout. She first took part in the discussions of the gods as an opponent of the savage Mars. She was the patron of heroism among men, the protectress of the arts of peace, the symbol of thought, and the goddess of wisdom. She was especially the national divinity of the Athenians, and on the Acropolis of Athens stood the magnificent temple of the Parthenon, dedicated to her, and containing her statue by Phidias. The helmet, buckler, lance, and ægis were her attributes; and the olive branch, serpent, and owl were sacred to her. See ATHENA; PALLAS.

Minghetti (mën-gët'tè), Marco, 1818-86; Italian statesman; b. Bologna; was a journalist, and, 1848, became Minister of Public Works at Rome, but soon entered the Sardinian army. In 1856 he assisted Cavour at the Congress of Paris, and subsequently became secretary general in the Ministry of Foreign Affairs. As a member and president of the Assembly of the Romagna provinces, he promoted their annexation to Victor Emanuel's dominions. He was elected to the National Parliament; was for a time Minister of the Interior; and, 1863-68, Premier and Minister of Finance. In 1869 he became successively ambassador in London and Minister of Agriculture; and was again Prime Minister, 1873-76, when he was replaced

by Depretis. He was an advocate of free trade, and his writings chiefly relate to political economy.

Mingrelia, down to 1804 an independent principality of Transcaucasia; in that year became subject to Russia. It corresponds to the ancient Colchis, and its capital, Izgaur or Iskuriah, on the Black Sea, is identified with the ancient Dioscurias, a colony of Miletus. The Mingrelians, numbering (1890) abt. 214,000, are closely related to their neighbors the Georgians.

Minho (mên'yô), river which rises in the Sierra de Mondoñedo, in Galicia, Spain, and flows mainly SW., forming the NW. boundary line of Portugal, to the Atlantic near Caminha, about 30 m. S. of Vigo; is about 150 m. long, and navigable for only a short distance. Its principal tributaries are the Sil and the Avia.

Miniature Paint'ing, species of painting on a small scale, executed with water colors on vellum, prepared paper, or ivory, or in enamel. The word originated from the ancient practice of writing the initial letters of manuscripts in *minium* or red lead. The ancient Egyptians illuminated their papyri with colored hieroglyphics, and the art seems to have been familiar to the Greeks and Romans; but the Middle Ages, and especially the period from the eighth to the fourteenth century inclusive, witnessed its most perfect development. The illumination of missals was for many ages the chief form in which miniature painting was practiced. The art seems from an early period to have been divided into two branches, the professors of the first being called *miniatori* or miniature painters, or illuminators of books, and those of the second *miniatori calligrafi*, or calligraphers. Sometimes the two branches were practiced by the same person, but about the middle of the fourteenth century the execution of large illuminated initials, adorned with various fanciful objects and figures, became a distinct occupation. The Byzantine artists particularly excelled as illuminators, and their manuscripts exhibit intricate arabesques of mixed foliage and animals, and the richest architectural fancies in the margins. Under the early Carolingian kings of France the transcription and embellishment of manuscripts were greatly encouraged. The English manuscripts are not inferior to the Continental.

Among the most celebrated of the *miniatori*, who were also equally if not more celebrated in other branches of art, may be mentioned Simone Memmi, Giotto, Fra Angelico da Fiesole, Jan van Eyck, Squarcione, Girolamo dai Libri, Hans Memling, and Giulio Clovio. The term miniature painting is now applied almost exclusively to small portraits executed on small thin sheets of ivory, which, on account of the semitransparency of its texture, is preferred to any other material. In England the art has been cultivated by an eminent line of artists from Holbein downward, embracing Nicholas Hilliard, Isaac and Peter Oliver, Samuel Cooper, Hoskins, Flatman, Gibson, Cosway, Ross, Newton, Thorburn. Under the First Empire the French had many excellent miniaturists, including Isabey, Augustin, Guérin,

Saint, Mme. de Mirbel. The most eminent American miniature painter was Malbone, whose works are executed with great delicacy, and after the lapse of many years retain much of their original freshness. See PAINTING.

Minie (më-nyä'), Claude Étienne, 1804-79; French inventor; b. Paris; entered the army as a volunteer; fought in Algeria; made a captain, 1849; became a teacher in gunnery at the school of Vincennes, 1852, and went, 1858, to Egypt as superintendent of a factory of fire-arms and director of a musketry school at Cairo. In 1849 he brought out his invention of the rifle ball that bears his name. It is cylindrical, conical in the front, hollow in the rear, and provided with a ridge of thin iron, which by being pressed into the grooves of the barrel when the ball is forced through, gives to this a much higher precision and range. His invention was the first application of the principle of expansion in the construction of fire-arms.

Min'ims, or **Min'imi**, Order of the, monastic order founded by St. Francis de Paul in Calabria, 1436; confirmed by Sixtus IV, 1474, and given its present name by Alexander VI, 1493. Its founder called them the Hermits of St. Francis of Assisi. In Paris they were called *Bons Hommes*; in Spain, *Fathers of Victory*; in German, *Pauliner*. The name *Minim* (least) is derived from the humility of their bearing—this being one of their characteristics. Bread, water, and oil alone formed their sole dietary, and fasts were numerous and severe. Besides monks there were nuns and tertiaries. At first the order spread rapidly, but now it has only a few monasteries in Italy, and still fewer nunneries.

Min'ing, in its widest sense, the winning of useful native minerals or metals. Among the useful minerals are included, by statisticians, mineral oils, natural gas, mineral springs, and building stones. The methods of mining pursued depend upon the location of the deposit, the character of the mineral, its value, the nature of the rock in which it is imbedded, and the extent and position of the deposit. When the mineral is exposed at the surface, or is covered only by a shallow layer of soil, quarrying is resorted to. Modern machinery for the removal of earth has been so much improved that stripping of the ore deposit or bed can be carried to considerable depth. This method permits very cheap extraction, but is hampered with difficulties growing with increasing depth. Surface mining plays a very important part, however, in the working of alluvial deposits. A very large part of the gold produced in the world and the greater part of the tin ore mined are obtained through surface mining. It has led in the U. S. to the development and application on a grand scale of what is called hydraulic mining to the recovery of gold from alluvial deposits. Mining, as usually understood, deals, however, with the extraction of the useful mineral by underground operations.

Whenever it is possible the deposit is attacked by a tunnel, since it saves hoisting and pumping, and in many instances greatly facilitates ventilation. Below the superficial drain-

age a vein or bed must be reached by a shaft or a slope, with a series of horizontal adits, spaced conveniently apart, which lead to the mineral mass at different levels. If we imagine an inclined tabular deposit, such as a metallic vein usually is, and as a coal bed may be, it would seem cheapest to run down in it by means of a slope dug in the material itself. That process, in fact, turns out the valuable matter at once, and might more or less pay for itself while in operation; but as a shaft or slope is the most important of all the preparatory works, being usually intended to endure, and requiring substantiality for the incessant needs of hoisting and pumping, it is necessary to make such a construction solid, and therefore a slope in a vein must be supported by flanking masses devoted to that object alone. In a coal mine this sacrifice is not of much importance, but in a metallic one it might be a greater loss than would be compensated for by the slight advantage of a slope. Moreover, a slope to a given level is longer and more irregular than a shaft sunk vertically in the country rock; the development of hoisting ways, cables, pump rods, pipes, is therefore greater and the service more inconvenient. The usual method, particularly when some capital is at command, is to sink a vertical shaft so as to strike the deposit in depth.

Supposing, then, that a vertical shaft for the attack of a vein has been sunk, and as deep down at once as various reasons will allow, it is next put into connection with the deposit by means of the crosscuts, which are galleries sloping a little toward the shaft for drainage and rolling. From where the crosscuts pierce the vein, next are run gangways to right and left in the vein itself. These make the different levels, and as they are permanent ways for rolling they have the same dimension as the crosscuts; and, like them and the shaft, are strongly timbered. Finally, these levels being put into communication by slopes in the vein, the mineral mass is seen to be subdivided into a set of parallelopipeds, and presenting each four disengaged angles on which they may be easily attacked for the prosecution of exploitation, the taking out of the parallelopipeds so prepared and exposed. If such a parallelopiped be attacked on an upper corner by miners, who with pick, drill bar, and shovel delve into and break away the mass beneath them, such is called underhand stopping, which is now rarely practiced. Overhand stopping is an attack on one of the lower angles of a parallelopiped. In this case the miners are, as it were, undermining the whole parallelopiped; the one in advance is directly on the timbering of the gangway beneath him; the refuse is piled up behind on this timbering, and the other miners follow, standing on that or on trestles, so that the profile of attack becomes, and shows, like a stairway upside down.

The exploitation of thick veins is effected by different dispositions. For example, when there is abundant filling they may be attacked from below upward, taking out horizontal slices, which are successively filled; or, again, where caving is allowable, they may be taken from above downward, each slice being treated like

a horizontal bed, without filling. Finally, the method by pillars and galleries is applicable anywhere. That title ordinarily refers to an exploitation in which the pillars of the mineral are used for support alone, and are supposed to be left and abandoned utterly. All the foregoing, except underhand stopping, applies to coal mining, but this last is at the same time a larger and yet a more delicate kind of mining than metallic. Coal mining differs from other mining principally because the fronts ought to be larger, because there is comparatively little refuse in ordinary coal beds, and because the generation and ignition of fire damp in fiery mines exact peculiar lighting, particular ventilation, and, besides, a disposition of works which admits of handling large quantities economically. This consideration leads to disposing the main plan in boundaries, with walls of coal left between, and also to the style of pillar-and-stall exploitation. In this the pillars are long strips left between the stalls, which are headings run into the coal, directed so as to take an easy grade, and out of which the coal is entirely won. The pillars are intended to be subsequently cut through and robbed out; in the meantime there is in each front or breast a seclusion from outside damage. With softer materials the actual work of extraction by the miner consists in cutting a deep groove under the mineral to be won, sometimes supplemented by vertical cuts and prying off the body thus loosened. In harder material blasting is resorted to.

Interior Transportation.—From the fronts down to the gangways the matters are sent in barrows, sledges, shutes, or cars. In the main ways there are always railways; the tracks are narrow and the rails light, but laid best on sleepers, as above ground. The cars may be iron or wood; they must have a low center of gravity; wheels close together, for the curves are short, and encumber with the least possible dead weight. The motors are men and boys, mules, small horses, stationary engines with endless chains to take trains, locomotives, or electric motors. Examples of great drains used as canals for subterranean transportation are also familiar.

Hoisting.—At the mouth of the shaft is planted a derrick, on top of which are two sheaves or pulleys to bend the cables from the shaft to the winding drums or reels. The cages are elevators, which carry one or more cars; they are guided by vertical strips of timber fixed to the sides of the hoisting way for that purpose, and these also serve in connection with the safety catches, which are attached to all cages, particularly if miners are hoisted in them.

Pumping.—In the Cornish type the pumps of a deep mine are composed of a series of lifts, each more than 100 ft. high. All the pumps are force pumps with plungers, except the lowest, which is a lift pump, more convenient for following the sinking of the shaft or being moved about. One main rod of wood and iron stretches from top to bottom of the shaft, and to this are fixed by spurs or shoulders the rods of the force pumps. The weight of the main rod is almost always greater than that of the

column to lift; therefore the work of the engine is limited to lifting that rod, which, when released, sinks and moves the plungers. In the U. S. practice favors the use of direct-acting pumps.

Ventilation is either natural or artificial. Artificial ventilation is produced by pneumatic machines, by fans, by furnaces—a common and cheap method, but dangerous in fiery mines—and by jets of steam. On the whole, it is found preferable to ventilate by drawing out the air, rather than by forcing it in; and this course is particularly advantageous in coal mines, because by rarefying the air, instead of condensing it, the fire damp is more freely liberated to be wafted away. The directing and modifying of the currents is effected by doors and air shutters in the mine ways. Most miners who perish by explosion in coal mines are victims not of the fire damp, but of the choke damp, or carbonic acid, after the catastrophe, particularly if the doors and ventilating flues are disabled; therefore in these dangerous mines the means and potentiality of ventilation are vitally important.

Milling at coal mines consists only in breaking, picking, screening, and washing the coal. Masses of metallic ore when first extracted and dumped are first broken by hammers or sledge work in a pile-driver frame; then treated by jaw crushers and cylinder rolls, sometimes toothed; then transmitted to the stamps, which are of various patterns, the most powerful being regular steam pestles working direct from the steam cylinder. The metallic mud thus obtained is concentrated further by washing in jigs, shaking tables, cloth rollers, and the slimes are finished off in sluices and long tailing labyrinth. For *submarine mines*, used in warfare, see TORPEDOES.

Min'ister. See AMBASSADOR; CONSUL; DIPLOMATIC AGENTS.

Mink, animal belonging to the weasel family (*Mustelidae*) and the genus *Putorius*, especially *P. lutreola* of Europe and N. Asia and *P. vison* of N. America. The former is a smaller animal, with a much finer fur than the American mink. Still, the mink of N. America



AMERICAN MINK.

yields fine and high-priced furs. The mink is 15 to 18 in. long, of a rich, glossy brown, with a white patch on the chin, or sometimes a white line down the throat. Minks frequent small streams and forests and mountains, swim well, and catch fish, frogs, mice, and birds. They are easily bred in a half-domesticated state. They are easily trapped, being neither suspicious nor cunning.

Minneapolis, capital of Hennepin Co., Minn.; on both sides of the Mississippi River, at the

Falls of St. Anthony; 10 m. NW. of St. Paul; area, 53 sq. m.; largest flour-making place in the world. It is on a broad esplanade, which commands a fine view of the falls; is regularly laid out, with straight avenues averaging 80 ft. in width; and has several beautiful lakes, including the famous Minnetonka, and the celebrated Falls of Minnehaha, within easy access. The lake region, affording excellent boating, bathing, hunting, and fishing, is becoming a popular summer and autumn resort. The city is the seat of the Univ. of Minnesota, St. Thomas's College (Roman Catholic), Augsburg Theological Seminary (Lutheran), Academy of the Holy Angels (Roman Catholic), Graham Hall School for Girls, Stanley Hall, and Minneapolis Classical School. Other noteworthy buildings are the City Hall and Courthouse (cost \$4,000,000), Post Office (\$600,000), Pillsbury Science Hall, Public Library, Masonic Temple (\$400,000), Central High School, West Hotel (\$2,000,000), Northwestern Guaranty Loan (\$1,500,000), New York Life Insurance (\$800,000), the Syndicate Block, and the residence built by W. D. Washburn (\$1,500,000). Minneapolis has one of the most extensive park systems in the country, and numerous bridges across the river, several of stone and steel. The stone viaduct of the Great Northern Railway is particularly notable as a masterpiece of engineering. According to the U. S. census of 1909, the city had 1,102 "factory-system" manufacturing plants, operated on a capital of \$90,382,000, and yielding products valued at \$165,405,000, chiefly the output of flour and grist mills, lumber, malt liquors, and foundry and machine-shop products. The city was originally settled on the W. bank of the river, 1849, and was enlarged by the annexation, 1873, of St. Anthony, on the opposite bank. Pop. (1910) 301,408.

Minnehaha (Dakota, "laughing water"), waterfall in Hennepin Co., Minn., celebrated for its beauty. Here the small river Minnehaha leaps 60 ft. down a limestone precipice. It is half a mile from the Mississippi and near Minneapolis. Although not a large body of water, the spray and sparkle of the waters together make it deserve the name "laughing water." The name has become famous through Longfellow's "The Song of Hiawatha."

Min'nesingers, members of a school of German poets, belonging chiefly to the nobility, who, from the latter half of the twelfth to the close of the thirteenth century, cultivated lyric poetry as an art. They were succeeded by the Mastersingers. The origin and growth of the minnesong coincides with the development of the German chivalry during the twelfth century, though it is incorrect to regard the minnesong a product of the French influence which at that time made itself felt in the social life of the German courts and castles. The oldest specimens of the minnesong which originated in Austria do not indicate the least trace of such foreign influence. Their resemblance in contents and language to the popular song recorded in the fourteenth and fifteenth centuries makes it, on the contrary, quite evident that the oldest minnesong devel-

oped from the popular German love song, of which we possess no documents previous to the middle of the twelfth century.

Minneso'ta (named from Minnesota River), popular name, GOPHER STATE; state flower, moccasin flower; state in the N. central division of the American union; bounded N. by the Dominion of Canada, E. by Lake Superior and Wisconsin, S. by Iowa, W. by N. Dakota and S. Dakota; area, including all marginal waters, except those of Lake Superior, 84,682 sq. m.; pop., census of 1910, 2,075,708; foreign born, chiefly Germans, Swedes, and Norwegians; capital, St. Paul; principal cities and towns, Minneapolis, St. Paul, Duluth, Winona, Stillwater, Mankato, St. Cloud, Faribault, Red Wing, Brainerd, Rochester, Fergus



Falls, Little Falls, Owatonna, Austin, New Ulm, Crookston, Albert Lea, Hastings; principal educational institutions, Univ. of Minnesota, Minneapolis; Hamline Univ. (Methodist Episcopal), St. Paul; St. John's Univ. (Roman Catholic), Collegeville; Carleton College (nonsectarian), Northfield; Gustavus Adolphus College (Lutheran), St. Peter; Albert Lea College for Women; Macalester College (Presbyterian), St. Paul; normal schools at Mankato, Moorhead, St. Cloud, and Winona.

The average elevation of the whole state is 1,275 ft. above sea level; N. central part contains a plateau, the highest points of which are 1,750 ft. above sea level. The granite pinnacles of the Giant Mountains, N. of Lake Superior, reach a height of 2,200 ft., while the Coteau des Prairies gives to several SW. counties an elevation of some 1,800 ft. The Mississippi, which has its sources in Lake Itasca; the Minnesota, and the Red are the only navigable rivers, and navigation has almost ceased on the last two. Among the affluents of the Mississippi are the Minnesota, Zumbrota, Root, Cannon, Crow Wing, Willow, St. Croix, and Rum. The Mississippi forms a part of the E. boundary and the Red more than half of the W. boundary. In the extreme S. part are the headwaters of the Cedar and Des Moines, which, flowing S., at length reach the Mississippi. The Rock River empties into the Missouri. The state contains some 10,000 bodies of water, ranging from Red Lake, 340 sq. m.

in area, down to inconsiderable ponds. A few, like lakes Traverse and Big Stone, in the Minnesota trough, and Lake Pepin, in the Mississippi Valley, are mere enlargements of river beds. The Lake of the Woods and Rainy Lake and Rainy Lake River form part of the boundary with Canada. The climate is very healthful, and fair weather the rule for the year; winter dry, with moderate snowfall; average temperature for the year of the central part of the state is 44.6°—for the summer 70.5° and for the winter 16.1°; average precipitation for the year, 28.75 in.; mean height of barometer, 30.

The state contains iron mines of phenomenal richness and accessibility. The region known as the Vermilion Iron Range extends both E. and W. from Tower. This yields high-grade ore, mostly suitable for Bessemer steel. Another range of iron-bearing rock, known as the Mesabi, extends from the Pokegama Falls of the Mississippi River E. 145 m. The ore is soft hematite. In 1910 the two ranges yielded 31,966,769 long tons. Other mineral products are copper and plumbago, found near Lake Superior; coal, gold, silver, pottery, clay, brick clay, kaolin, building sand, granite, dolomites, dolomitic limestone, glass sand, sandstone, jasper, slate, and peat; value of mineral products (1910), excluding iron ore, \$6,088,620. Stratified sands and gravels form the subsoil and, mingled with other materials from the surface, form also the surface soil.

There is very little stony ground. The top covering of the soil, commonly known as "black dirt," varies in depth from a few inches to several feet, and is peculiarly favorable to the growth of cereals and of garden vegetables. Farm crops, 1911: Corn, 74,140,000 bu.; wheat, 43,935,000 bu.; oats, 67,214,000 bu.; barley, 28,025,000 bu.; flaxseed, 3,200,000 bu.; rye, potatoes, and hay are also important crops; wool growing is an important industry. The chief manufacturing industries are flour and grist milling and the production of lumber and timber products. Minnesota is one of the leading lumber-producing states, having extensive forests of white and Norway pine and other trees. The great center of lumber manufacture is Minneapolis. "Factory-system" manufacturing plants (1909), 5,561; capital employed, \$275,416,000; value products, including custom work and repairing, \$409,420,000. Minnesota has two U. S. customs districts and ports of entry—Duluth, on Lake Superior, and Minnesota City, with the chief office at St. Paul. In the calendar year ending June 30, 1907, the imports of foreign and domestic merchandise had a value of \$6,516,423; exports, \$22,655,710.

Though of recent settlement, Minnesota has long been the seat of a considerable traffic with the Indians and of missionary enterprise. As early as 1680 Hennepin and La Salle penetrated these wilds, followed by La Hontan and Le Sueur, and in the eighteenth century by Carver; and within the nineteenth century this region was thoroughly explored by Pike, Long, Keating, Nicollet, Schoolcraft, Owen, and others. The military post at Fort Snelling was established, 1819. In 1837 a small tract of

country between the St. Croix and Mississippi was ceded by the Indians to the U. S., and lumbering operations commenced on the St. Croix. The Territory of Minnesota was established, 1849. It embraced nearly twice the area of the present state, its W. limits extending to the Missouri and White Earth rivers. Up to this period the country was occupied almost entirely by Indians; but a small civilized population of whites and half-breeds had grown up around the trading posts and mission stations, amounting, 1849, to 4,857. In 1851 the Sioux ceded to the U. S. all their lands in the territory W. of the Mississippi to the Big Sioux River. The state was admitted into the Union, 1858. That portion of it lying on the E. side of the Mississippi originally belonged to the country termed the "Territory Northwest of the Ohio." The part W. of the Mississippi, more than two-thirds of its area, was originally a portion of Louisiana, and came into the possession of the U. S., 1803; and before it was included in Minnesota it had been part of the Territory of Missouri, and subsequently of Iowa.

Minnesota Riv'er, stream which rises in Big Stone Lake, on the boundary between Minnesota and S. Dakota, traverses the State of Minnesota, flowing first SE. and then NE., reaching the Mississippi 5 m. above St. Paul. It flows through the Coteaux des Bois, or Big Woods, a great forest of deciduous trees, and is navigable 300 m. in high and 45 in low water; total length, 470 m.

Minnesota, University of, coeducational institution in Minneapolis; opened, 1869; comprises a college of science, literature, and arts; college of agriculture, college of engineering, metallurgy, and the mechanic arts; college of law, and colleges of medicine, dentistry, and pharmacy. The university has no dormitory system, confers no honorary degrees, and, besides its regular departmental work, has had charge of the geological survey of the state since 1873. Its endowment consists of over 200,000 acres of land granted by the National Government, or the proceeds of the sales thereof, which amount to over \$1,370,000. There were (1910) 193 professors and instructors, 5,050 students in all departments, about 145,000 volumes in the library, scientific apparatus valued at \$876,000, and grounds and buildings, \$4,396,256.

Minnewau'kon, or Dev'il's Lake, body of water in the N. part of N. Dakota; is about 40 m. long and 12 m. wide in its broadest part. Its water is of a deeper tint than that of the surrounding fresh-water lakes, and is so brackish as to be unfit to drink.



MINNOW.

Min'now, name applied to many small fresh-water fishes of the family *Cyprinidae*. The

English minnow is *Leuciscus phoxinus*, a very common little fish of the brooks, with blunt head, small scales, and the males brightly colored in spring. In the U. S. the name is extended to some 200 small fishes, species of *Hybognathus*, *Notropis*, *Leuciscus*, *Rhinichthys*, etc.

Mi'nor, Robert Crannell, 1840-1904; American landscape painter; b. New York; studied art in Belgium, France, and Italy; was president of the Société Artistique et Littéraire at Antwerp, 1874, and of the Salmagundi Club, of New York, for several years; studio in New York. His paintings include "The Close of Day," "Under the Oaks," "The Cradle of the Hudson," and "A Mountain Path."

Minor. See INFANT.

Minor (in music). See MAJOR.

Minor'ca, second in size of the Balearic Islands; 24 m. ENE. of Majorca; greatest length, 33 m.; greatest breadth, 13 m.; area, 293 sq. m.; pop. (1897) 38,258. It rises gradually toward the center, where Monte Toro is nearly 5,000 ft. high. The climate is very hot in summer and cold in winter, and the soil is rather sterile. Iron, lead, copper, and marble are found. Minorca is of great importance in the Mediterranean trade, and the capital, Port Mahon, has an excellent harbor. It belonged to the British during most of the eighteenth century. In 1802 they ceded it to Spain.

Mi'norites, name given by St. Francis of Assisi to his original order. (See FRANCISCANS.) The name is still borne by some congregations of that great order or group of orders.

Mi'nor Proph'ets, The, name given to Hosea, Joel, Amos, Obadiah, Jonah, Micah, Nahum, Habakkuk, Zephaniah, Haggai, Zechariah, and Malachi because of the brevity of their writings.

Mi'nos, King of Crete, to whom the Cretans traced their laws and political institutions; is said by Homer and Hesiod to have been a son of Zeus and Europa, a brother of Rhadamanthus, and, after his death, one of the judges of the Shades in Hades. Later poets and mythologists speak of two kings of Crete of the name of Minos, probably in order to establish harmony between the many contradictory myths which clustered around the name.

Min'otaur, in Grecian mythology, a monster, half bull, half man; was the offspring of Pasiphaë, the wife of Minos, and Poseidon's bull. Minos shut the monster up in the Cnossian labyrinth, where a number of youths and maidens, paid as a tribute by Athens, were sacrificed annually to it until it was killed by Theseus. The monster has been frequently represented by Greek artists either in his early adventures, enclosed in the labyrinth, and fighting with or subdued by Theseus.

Minsk, capital of the government of Minsk, Russia; on the Svisloetz, a tributary of the Beresina; 436 m. WSW. of Moscow; has many

good educational institutions and is the seat of the provincial government, but its trade and manufactures are unimportant. Pop. (1907) abt. 91,000.

Min'strels, class of men in the Middle Ages who amused their patrons by poetry and music, singing to the harp their own verses or the popular ballads and metrical histories of the time. They sometimes accompanied their music with mimicry and action, so that they were often called mimi and histriones. The name minstrel is of Norman origin, and they were the successors of the skalds and bards of the North.

Mint, any member of a large and well-defined group (*Labiatae*) of dicotyledonous, mostly herbaceous plants, with opposite leaves, and with gamopetalous, mostly two-lipped flowers, four or two stamens, and superior four-lobed ovary. They are distributed



SPEARMINT.

throughout all parts of the earth, and number 2,700 species, of which about 150 are natives of the U. S. Many are grown in gardens and greenhouses—e.g., species of *salvia*, *coleus*, *perilla*, *melanthus*, etc. Many domestic medicines are obtained from species of this family, as peppermint, horehound, hyssop, lavender, rosemary, sage, thyme, pennyroyal, catnip, balm, etc.

Min'to, Gilbert John Murray (fourth Earl of), 1847–1914; English statesman; b. London; entered the Scots Guards, 1867; served with Turkish army, 1877; in Afghan War, 1879; private secretary to Gen. Lord Roberts at the Cape, 1881; military secretary to Lord Lansdowne, Governor General of Canada, 1883–85; chief of staff in NW. Canadian rebellion, 1885; Governor General of Canada, 1898–1904; Viceroy of India, 1905–10.

Mints and Mint'ing. A mint is a factory of coin conducted under the sanction of public authority. The use of the precious metals, as measures of value and mediums for effecting the exchange of commodities, dates from the earliest period in the history of the human

race of which any record exists. Originally, gold and silver passed by weight in the form of lumps, buttons, wedges, and spikes. With the progress of civilization, increase of barter, and the extension of commerce came the necessity for individual pieces of metals of uniform fineness, weight, and value, in form for convenient use, and bearing in effect the certificate of the supreme authority as to such fineness, weight, and value, and to pass by tale or count. The best authorities are generally agreed in according the invention of coins to the Lydians, and the period of their first use to about the seventh century B.C. The use of coins rapidly spread, aiding materially in the exchange of commodities, and powerfully promoting intercourse between the different countries of the world.

The mints of the U. S. may be taken as typical of all others. With the assay offices they are under the supervision of a director, whose headquarters are in the Treasury Department at Washington, and who is subject to the general direction of the Secretary of the Treasury. The mints are located at Philadelphia, San Francisco, Carson City, and New Orleans; and the assay offices at New York, St. Louis, Denver, Col.; Boise City, Ida., and Charlotte, N. C.

The various operations and processes to which bullion is subjected may be summarized as follows:

As a general rule, all bullion when received is subjected to a preparatory or "deposit" melting, for the purpose of freeing it from all earthy matter and adhering substances, as well as to render the mass homogeneous preparatory to assay. Samples for assay are taken for gold from the cast bar, and from silver while the bullion is in a fused condition. The weight of the bullion after deposit melting is that with which the depositor is credited and the melter and refiner charged. The bullion, if not of sufficient fineness and otherwise in condition to admit of being brought to the legal standard for coinage—nine parts pure metal and one of copper—is subjected to purification by melting and the use of protective and refining fluxes.

The bullion, having been freed from all foreign substances and base metals, or separated where gold and silver are associated in the same bullion, is alloyed with copper and brought to the legal standard for coinage. It is then cast into ingots and assayed, and if found to be sufficiently within the deviation from standard or "tolerance" allowed by law, is transferred to the coiner, who by a series of operations converts it into coin.

The principal operations and processes to which ingots of standard fineness are subjected in their manufacture into coin may be classified as follows: (1) *The rolling*, which reduces the ingots to strips or fillets of a thickness proper for the denominated coins. (2) *The annealing*, which is rendered necessary to preserve the ductility of the metal during the rolling operation. (3) *The drawing*, whereby any want of uniformity in the thickness of the strips is corrected. (4) *The cutting*, or forcing from the strips "planchets" or blanks of

the size and shape of the coin. (5) *The adjusting*, or weighing separately of each blank, and bringing those above standard within the working limit of deviation by filing. (6) *The milling*, which presses up the edge of the blank in order to protect the surface of the coin. (7) *The cleaning*, whereby all oxidation is removed from the face of the blank. (8) *The coining*, or impressing upon the blanks the devices and inscriptions prescribed by law.

The law allows on all coins a certain deviation from standard weight. This deviation, however, is seldom reached, the coiner fixing a limit within the legal deviation, which is known as the "working tolerance." All pieces found below the "working tolerance" are designated "condemned lights," and returned to the melter and refiner. The remainder, known as "heavies," "lights," and "standards," are kept separate until they reach the weigh room as coin, when they are united in proper proportions, and made up into drafts for delivery by the coiner to the superintendent, who is acting treasurer. The subsidiary silver coins, half dollar, quarter dollar, and dime, are weighed separately, and all above or below the legal tolerance rejected.

From each delivery of coins by the coiner to the superintendent a certain number of pieces are indiscriminately taken, sealed up, and placed in the pyx, for the annual trial or test of the coinage, which is made in February of each year by a commission constituted by law for that purpose; and if it appears by such examination and test that the reserved coins do not differ from the standard fineness and weight by a greater quantity than is allowed by law, the trial is considered and reported as satisfactory; but if any greater deviation from the legal standard or weight appears, the fact is certified to the President of the U. S., and if on a view of the circumstance he shall so decide, the officer or officers implicated in the error are thenceforward disqualified from holding their respective offices.

Under the title of "bullion fund" a part of the public moneys are placed at the different coinage mints and at the assay office, New York, out of which depositors are paid for their bullion, in coin or bars, as soon as the value thereof has been ascertained by assay (generally three days thereafter), and on payment being made the bullion so deposited becomes the property of the U. S. See COINAGE.

Min'uet, graceful and stately dance, now rarely practiced except on the stage; supposed to have originated in the French province of Poitou. The first minuet was danced by Louis XIV at Versailles, 1653. The name has been derived from *menu*, "little," the steps of the dance being short. The minuet or *minuetto* has also been effectively employed by composers as an exclusively musical movement in symphonies, quartets, etc.

Min'uit, or **Min'newit**, Peter, abt. 1580-1641; American colonial governor; b. Wesel, Rhenish Prussia; was appointed by the Dutch W. India Company its director general in New Netherland; landed on Manhattan Island, May 4, 1626; bought the island for sixty guilders;

built Fort Amsterdam; was recalled, 1631. In 1637 he sailed with a commission from the Queen of Sweden authorizing him to plant a new colony on the W. coast of Delaware Bay. He anchored in Chesapeake Bay, March, 1638, and soon began to build Fort Christiana, near the present site of Wilmington, and increased the settlement, which he called New Sweden. It was the first permanent European settlement of Delaware, and was annexed to the Dutch possessions, 1655.

Min'ute, sixtieth part of an hour; also, as a portion of the arc of a circle, the sixtieth part of a degree. The former is called a minute of time, the latter a minute of arc. In architecture it is the sixtieth part of the diameter of the shaft of a column, measured at the base.

Min'yas, rich mythical King of Orchomenos, in Bœotia, and founder of the Minyan race. His genealogy is variously given. He was the first to build a beehive treasure house, the ruins of which were excavated by Schliemann, 1880-86. The daughters of Minyas refused to take part in the worship of Dionysus when it was being introduced into Bœotia, and they were finally punished by being changed into bats and owls.

Miocene Period, division of geologic time following the Eocene Period and preceding the Pliocene. In the chronologic system adopted by the U. S. Geological Survey for the geologic atlas of the U. S., the Miocene and Pliocene periods of earlier classifications are included in the Neocene Period.

Mirabeau (mê-râ-bô'), Honoré Gabriel Ri-quetti (Count de), 1749-91; French revolutionist; b. Bignon, near Nemours; son of a theoretical philanthropist; was a lieutenant of cavalry in his seventeenth year, but was so wild that his father caused him to be imprisoned; after serving in Corsica, settled on one of the family estates in Limousin, where he wrote an "Essay on Despotism," and married unhappily; was again imprisoned by his father, 1774, but escaped, eloping with the Marquise de Monnier, and resided in Amsterdam, doing hack work for booksellers. Arrested, 1777, he was confined in the dungeon of Vincennes for nearly four years, and then wrote an "Essay on Arbitrary Warrants of Imprisonment" ("Lettres de Cachet"). On his release he quarreled with the marquise, and attempted in vain by a lawsuit to compel his wife to return to him. During a residence in London he published "On the Order of Cincinnati." Returning to France he attacked the financial system of Calonne. In 1786 he was sent on a secret mission to Berlin, the fruits of which were "The Prussian Monarchy Under Frederick the Great" and "Secret History of the Court of Berlin." Attacks on the government forced him to retire to private life, but after rejection as a candidate by the nobility he was elected to the Assembly, 1789, as a member of the third estate, by Aix and Marseilles. From that moment to his death he was the leading statesman of France. He established the third estate as a dominating power in the States-General,

and the States-General as the dominant power in the government. Thus he started the Revolution, and when it became too violent he tried to stem its course, defending the royal prerogatives, but upholding civil liberty. In May, 1790, he entered into close relations with the court, which paid his debts in reward for his services. His popularity waned, but he still swayed the Assembly by his eloquence. He became president of the Assembly, 1790, and also of the Jacobin Club.

Miracle, in the strict usage of the word, a work of divine power, interrupting (or violating) the ordinary course of nature, and directly designed to attest the divine commission of him who works the miracle. Christ said: "The works that I do bear witness of me, that the Father hath sent me." German rationalism, in its earlier form, attempted the explanation of the gospel miracles by material and spiritual causes. Others, as Paulus, explained them by the supposition that the disciples confounded natural events with supernatural. Some, again, found in them only a symbolical or allegorical sense, and interpreted them as images of spiritual truths. In the mythical theory of Strauss they are explained, not as willful deceptions, but as a spontaneous expression of popular religious feeling, ascribing to Christ what is false in fact, but true in some very general philosophical idea. As to the position of miracles in the evidences, some divines, in the reaction against rationalism, have laid the chief stress upon these external signs of divine power, making the miracle to be the main source of an undoubting belief, while others put the truth of the doctrine in the front rank, and made the doctrine the test of the miracle, rather than the miracle the proof of the doctrine.

Miracles and Moralities, religious and allegorical plays; often called miracle plays and moral plays, and in later times mysteries. The subjects were either the narratives of the Bible or legends of the saints; and the moralities, which appeared later, intermingled allegory with sacred history. In the first ages of Christianity baptism was refused to anyone concerned with the theater, and in the fourth century the Church succeeded in extinguishing the drama everywhere except in Constantinople. This triumph had hardly been accomplished when the sacred ceremonies and commemorations of the Christian faith were transformed into dramatic representations. The progress of this Christian drama cannot be traced till about the eleventh century, when Theophylact of Constantinople introduced the feast of fools, the feast of asses, and other religious pastimes, which were celebrated in churches. To these sports the clergy added the acting of miracle plays, which were originally performed by ecclesiastics in churches and the chapels of monasteries. They were afterwards exhibited by companies of tradesmen, and the clergy were forbidden to take any part in them.

It is probable that miracles were introduced from Constantinople into Italy, and thence into France and England. The oldest known

are in Latin, but in the twelfth and thirteenth centuries they became common in the modern languages; and with some exceptions there is a general resemblance in subjects, characters, and theatrical machinery between those of different countries. The miracle of the Passion was one of the earliest, and from it the first theatrical company of Paris, established, 1402, was called the Brethren of the Passion. Its representation occupied several days. The Virgin Mary is a favorite character in French mysteries, and several of them bear the title of *miracles de Notre Dame*. Others are entitled mysteries of the Conception, of the Nativity, of the Resurrection, and of divers events in the legends of the saints and in the narratives of the Old and New Testaments. Germany was celebrated for its *Fastnachtspiele*, or carnival plays, in which religious subjects were treated with unbounded license.

The records of English miracle plays may be traced from the twelfth century. The Chester, Coventry, and Towneley mysteries form three great series. As early as 1268 religious dramas were exhibited by the incorporated trades in Chester. The sacred dramas of Coventry drew multitudes to that city; they were performed by the trade companies on Corpus Christi day, from 1416 to 1591. The Towneley mysteries, so named from the family having possession of the manuscripts, are supposed to be the plays written and performed by the Augustinian friars of Woodkirk. Christmas also was observed in this way in connection with the festivities of the Abbot of Mistrule. At York every trade was obliged to furnish out a pageant to adorn the occasion, and these pageants were fifty-four in number in 1415. From the reign of Henry VI miracles had been encroached upon and superseded by moral plays or moralities, in which abstract allegorical personages took the place of Scripture characters. Moralities reached their highest perfection in the reigns of Henry VII and Henry VIII, though they subsequently exhibited greater complication and ingenuity. In Paris the devout buffoonery of the Brethren of the Passion gave offense and caused their suppression in 1547. Mysteries are still occasionally performed at several places in Europe. See OBERAMMERGAU.

Mirage (*mā-rāzh'*), appearance of distant objects in the air, as if standing in the sky, or reflected from the surface of water. It is produced by refraction in strata of different densities, decreasing or increasing rapidly, and sometimes by refraction and reflection combined. There are several cases, of which the four following are the most common: (1) The mirage of the desert, which has the appearance of inverted objects, or reflections from the surface of water; (2) that which has the appearance of objects inverted in the air, and which is seen over the surface of water; (3) simple looming, when objects appear to be elevated above their real level, but are not inverted, the appearance usually taking place over water; (4) a combination of the two preceding, in which there are appearances of objects both erect and inverted. The mirage of the desert is explained as follows: In Fig. 1, in which the

curves are exaggerated, the aerial strata *a*, *b*, *c*, *d* decrease in density from above downward. This will cause a bending of the rays of light from the object further and further from the perpendicular, till the critical angle is reached, when they are totally reflected, causing the object to appear inverted below the horizon.

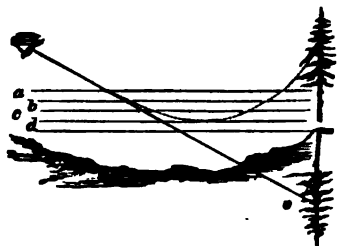


FIG. 1.—MIRAGE OF THE DESERT.

The mirage over water is explained by referring to Fig. 2, where the strata decrease in density from below upward. A vessel partly or entirely hidden by the curvature of the earth will appear inverted above the horizon when the rays of light are at first refracted from the perpendicular until the critical angle is reached at the stratum *d*, when total reflection

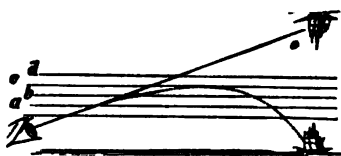


FIG. 2.—MIRAGE OVER WATER.

tion takes place, by which the ray is given an inclination downward, so that the object appears in the direction of *c*. Simple looming, in which the object is seen erect, will take place when the rays of light from it reach the eye before total reflection takes place, or before the critical angle is reached. When the object is seen both inverted and erect, the case is explainable by the examples already given.

Miramichi (mīr-ā-mē-shē'), bay and river of the E. coast of New Brunswick. The bay is about 21 m. long and 20 m. wide at its mouth. The river is formed by the junction of two branches about 50 m. from the sea, and is navigable to Newcastle by large ships, and higher up by smaller vessels. Salmon and many other valuable fish are taken here in great quantities.

Miramón (mē-rā-mōn'), Miguel, 1832-87; Mexican military officer; b. Mexico City; was a volunteer in the war with the U. S.; commissioned colonel, 1855; served for a time under Alvarez and Comonfort, but his sympathies were with the reactionists, of whom he became president, 1859; joined Zuloaga in the revolt in Mexico City and aided in driving Comonfort therefrom; made an unsuccessful attempt to capture Vera Cruz, where Juárez was maintaining a constitutional government; ordered the "massacre of Tacubaya"; again besieged Vera Cruz, 1860; was defeated there

and at Guanajuato, shut in at Mexico City, and routed by the Juarists at Colpualpam. On the occupation of the capital, he fled to France, counseled with Napoleon III, and returned to Mexico as an adherent of Maximilian. He was made grand marshal and minister at Berlin; again returned, 1866; with Maximilian was captured at the fall of Queretaro; and with him was shot.

Miranda (mē-rān'dā), Francisco Antonio Gabriel, abt. 1754-1816; Venezuelan revolutionist; b. Caracas; entered the Spanish army at an early age; was in the French service in the American Revolutionary War, 1779-81; went to S. America with plans for the liberation of the Spanish colonies, 1783; but his schemes were discovered and he fled to Europe. He was again in the French service as general of division, 1792-93, but gave umbrage to the revolutionists, and fled to England. In 1806 he fitted out an expedition in the U. S., and returned to S. America with the view of establishing a republic at Caracas, but was not successful. Toward the close of 1810 he again went to S. America, and maintained himself at the head of an army of insurgents; but, 1812, was delivered by Bolívar to the Spaniards, and carried to Cadiz, where he was kept in prison till his death.

Miranda, state of Venezuela; bounded N. by the Caribbean Sea, E. by Bermudez, S. by Bolívar, and W. by Zamora and Carabobo; includes the island of Margarita and neighboring islets; area, 33,969 sq. m.; pop. (1906) 146,489; capital, Ciudad de Cura.

Mirdites, peculiar and primitive people of Albania; a sort of military aristocracy, occupying a tract about 40 m. square, included between 40°-41° N. lat. and 17°-18° E. lon., nearly surrounded by the Drin. Orosch, a mountain fastness, is the residence of their prince. They never intermarry, but capture their wives from their Mussulman neighbors and give their own daughters to other Christian tribes. They number about 20,000, are nominally Roman Catholics, and are brave, faithful, and hospitable.

Mir'iam, Hebrew prophetess, sister of Moses. She was watching the infant Moses when he was found by Pharaoh's daughter, and called her mother Jochebed to nurse him for the princess. After the passage of the Red Sea she headed the triumphal procession of women, and led their song of victory. For speaking against Moses on account of his marrying an Ethiopian woman, she was struck with leprosy. Her name is the Hebrew form of Mary.

Mirkhond (mīr-chōnd'), 1433-98; Persian historian; b. Nishapur; chief work, "The Garden of Purity, Containing the Histories of Prophets, Kings, and Khalifs," which gives the history of the world from the creation nearly to his own time. Manuscript portions of this work are in the libraries of London, Paris, Berlin, and Vienna, and translations have been made into several languages.

Mirror, looking-glass or speculum, or any bright surface that reflects the rays of light

falling on it. Mirrors have been a part of the furniture of the toilet from a period of great antiquity. The earliest mirrors were formed of polished mineral substances or of metals, but after the invention of glass that substance naturally superseded most others in the construction of mirrors. The backs of glass mirrors were sometimes coated with lead, but about three centuries ago the process of covering glass with an amalgam of mercury and tin came into use in Venice, and has been since employed. The process, substantially the same now as when first introduced, consists in spreading out on a solid horizontal table a sheet of tinfoil, which is first rubbed and afterwards covered to a sensible depth with mercury, so that the superior surface may remain liquid. The mercury is prevented from flowing by means of slight ledges placed around the sheet. After having been scrupulously cleaned on its lower surface the glass to be coated is advanced horizontally along the layer of mercury, its lower edge being depressed below the surface, so as to exclude air and to remove impurities. When in proper position it is left resting on the mercury, and by tilting the table the superfluous fluid is allowed to flow off, being caught in a trough provided for the purpose at the margin of the table.

A uniform pressure is then applied to the glass, and it is allowed to remain for some time in this condition, after which it is carefully lifted, the amalgam adhering to it, and is placed with the amalgamated surface uppermost. Some weeks' rest is required to allow the amalgam to harden, and sometimes a mirror will not "dry" for months. Since 1836 pure silver has been more or less used for backing mirrors. The advantages claimed for the silver over the quicksilver process are: (1) Harmlessness to the workmen; (2) facility and expedition, the whole operation being completed in a few hours; (3) possibility of repairing damaged parts; and (4) superior power of reflection. A silver mirror reflects about twenty per cent, and reflects objects more truly in their natural colors. The durability of silver mirrors is still an open question. They are all liable to become spotted, and unless this difficulty be overcome it is hardly probable that the silver process will ever completely supersede the quicksilver.

Mi'rat. See MEEBUT.

Mirzapur (mēr-zā'pōr), capital of district of same name, Benares division, United Provinces of Agra and Oudh, British India; on the right bank of the Ganges; 45 m. SW. of Benares. The city is a busy place, the most important cotton market of India, with an extensive industry in cottons, woolens, and silks. From the river it looks very magnificent with its flights of marble steps leading from the temples down to the waters, but the interior consists mostly of mud huts. Shellac, brassware, and carpets of a very fine description are also made. Pop. (1901) 79,862.

Misdemean'or, in law, any crime less than a felony. The term applies equally to all crimes, whether of commission or omission, for

which the law has not provided a name. Misdemeanors are either those which exist at common law, *mala in se*, or those which are created by statute, *mala prohibita*. Under the former class, whatever, in the language of Blackstone, mischievously affects the person or property of another, openly outrages decency, disturbs public order, is injurious to the public morals, or is a corrupt breach of official duty, is indictable as a misdemeanor at common law. Misdemeanors created by statute are of two kinds. The one kind embraces those which consist in the omission or commission of an act enjoined or forbidden by the statute, though the transgression be not specially made the subject of indictment. The second kind includes those statutory offenses which are made specially indictable. The ordinary punishment of misdemeanor at common law is fine and imprisonment, or either of them, in the discretion of the court. See CRIME; FELONY; TORT.

Miserere (mīz-ē-rē'rē), Latin, "have mercy," name applied in the Roman Catholic Church to the Fifty-first Psalm, which in the Vulgate begins with that word, and is employed as a penitential hymn, particularly during Lent. It has been set to music by many eminent composers.

Mish'na (Hebrew, "study"), earlier part or text of the Talmud, first systematically arranged by Rabbi Judah the Holy and his school, in the second or third century. It is in Hebrew, and divided into six principal parts and sixty-three treatises.

Mis'sal, mass book of the Roman Catholic Church, containing the daily eucharistic service for the whole year. The Roman Missal consists of three principal parts: (1) The *Proprium Missarum de Tempore*, containing the formularies for the masses of the Sundays; (2) the *Proprium Missarum de Sanctis*, containing special formularies of mass for the festivals of several saints; (3) the *Commune Sanctorum*, containing general formularies for classes of saints, as apostles, martyrs, confessors, etc. The *Ordo Missæ*, containing that part of the mass which is invariable, is inserted in the first part of the Missal between Saturday of Passion Week and Easter.

Mis'sionary Ridge. See CHATTANOOGA.

Mis'sions, organized work for the propagation of religious doctrines, especially of the doctrines of Christianity. Islam and Buddhism have both made use of missions for the propagation of their tenets. With the former, however, force has been so prominent a feature that the essential element of all true mission work—persuasion by preaching and teaching—has been largely lost sight of. Buddhist missions have more nearly corresponded to Christian missions. The history of Christian missions may be divided into three periods: apostolic and early Christian, mediæval, and modern or post-Reformation. The mediæval missions are both Roman Catholic and Eastern; the modern are Roman Catholic, Protestant, and Greek Orthodox. 1. *Apostolic and*

Early Christian Missions.—These cover the period of the spread of Christianity from the time of Christ until about 500 A.D. It was chiefly the work of individuals, and was the development of the type first given by the apostle Paul in his journeys. During it the Gospel was spread throughout the whole of S. Europe, Great Britain, N. Africa and Ethiopia, and as far E. as Persia, and perhaps even China. 2.

Mediæval Missions.—These cover the period of about one thousand years, from 500 A.D. until the Reformation. They approach more nearly to the modern conception of missions. The chief place in it belongs to the Roman Catholic Church, although this is the period of the work carried on by the Nestorian Church, when its missionaries carried the Gospel throughout central Asia to India and into China. The Roman Catholic Church missions of the Middle Ages took their start from Ireland, and included in their scope England, Scotland, and N. Europe.

3. Modern or Post-Reformation Missions.—

(a) *Roman Catholic.*—In the East missionaries followed close on the heels of Vasco da Gama. In 1542 the first great Jesuit missionary, St. Francis Xavier, the Apostle of the Indies, landed at Goa. In 1522 the Franciscans entered Mexico, and not long afterwards the Dominicans followed. After the conquest of Peru the missionaries gained a foothold in S. America. In 1586 the Jesuits began their work in Paraguay. "In N. America not a headland was turned, a region explored, or a river discovered, but a Jesuit led the way," says Parkman. They were martyrs, and others took their places. The Recollects, or Reformed Franciscans, gave an example of quite as great self-sacrifice. After St. Francis Xavier, success continued to crown the efforts of the missionaries in the East. Robert de Nobili, a Jesuit, succeeded in making many converts. In spite of the most strenuous missionary effort in China the first baptism was not administered until 1584. After this the success of these Jesuits, especially under the celebrated Fr. Ricci, was phenomenal. In 1664 there were nearly 270,000 Christians. Japan showed more of success. As early as 1582 there were 200,000 Christians and 2,500 churches. Persecutions followed in both China and Japan, and in spite of the resolute heroism of martyrdom, closing with the massacre of 37,000 at Simbara, active Christianity died in both countries. During the nineteenth century the Roman Catholic Church continued to extend its work. The French missions of Africa possessed, in 1900, 59,400 converts, and 151,000 under instruction. According to estimates in 1906 there were 1,000,000 Roman Catholics in China, about 70,000 in Japan, 420,000 in Annam, 73,000 in French Cochinchina, 2,000 in Korea, and 50,000 in Madagascar.

(b) *Greek Orthodox Church of Russia.*—This is the only branch of the Christian Church, aside from the Roman Catholic and Protestant, that has undertaken any aggressive missionary work, and this has confined its efforts to Japan. Its missionaries began operations in N. Japan in 1870, and its communicants now number, perhaps, 50,000. *Protestant Missions.*

—Under the influence of Calvin, Admiral Coligny, about the middle of the sixteenth century, inaugurated a Reformation enterprise in Brazil, and at about the same time Gustavus Vasa sent a mission to the Lapps of Europe. In the latter part of the seventeenth century Hans Egede, a Norwegian pastor, opened up work in Greenland, and about the same time Ziegenbalg and Plütschau went as the first Protestant missionaries to India. At about the same time the Unitas Fratrum, formed two hundred years before by the union of the followers of Huss, some Waldenses, and Moravians, were led by the influence of Count Zinzendorf to commence their great work, which has continued in the van of mission enterprise. In 1732 Dober and Nitschmann set out for St. Thomas in the W. Indies, and, 1749, David Zeisberger became the apostle of the Delawares.

Prior to this the settlement of New England called the attention of the English people to the needs of the Indians, and King James, announcing that zeal for the extension of the Gospel was a special motive for colonizing, was followed by Cromwell, 1649, with the creation of the first missionary society, the Corporation for the Propagation of the Gospel in New England. The first missionary of this new work was John Eliot, followed by Mayhew and the Brainerds. The charter of the East India Company, granted by King William III, 1698, contained provisions for a missionary and educational as well as ecclesiastical establishment. In 1701 the Society for the Propagation of the Gospel in Foreign Parts was organized, but rather as a colonial than a foreign missionary society, though it did some work among the natives of the various English colonies. Thus the evangelical churches were waking up to the demands on them, and it needed only the genius and consecration of some man to start a general work. That man was Carey, a Baptist shoemaker and minister, who began his work by the publication of an "Inquiry into the Obligations of Christians to use Means for the Conversion of the Heathens." In 1793 came the beginning of the little Baptist Missionary Society, and in November of that year Carey landed at Calcutta.

Modern Protestant foreign missions may fairly be said to have begun with the work of Carey. One after another the different branches of the Church entered on the work, until before twenty-five years had passed all the leading ones had missionaries in every quarter of the globe. The first field to attract attention was the islands of the Pacific. The London Missionary Society (Congregational, formed 1795) started the first mission to those islands in 1800. In 1810 the American Board of Commissioners for Foreign Missions was founded in the U. S. This, now practically Congregational, was at first undenominational, and under its auspices the Presbyterian Church in the U. S. sent out its missionaries until 1837, when that Church established a separate board. Of the many other societies, nearly all formed since 1800, may be mentioned the London Society for Promoting Christianity among the Jews, 1809; the American Baptist Missionary Union (U. S.), 1814; the Methodist Episcopal

Church Society (U. S.), 1819; the Leipzig Missionary Society (German), 1819; the Paris Evangelical Missionary Society, 1822; the Protestant Episcopal Church Society (U. S.), 1835; the Reformed Church (Dutch, U. S.) Society, at first connected with the American Board, 1858; the Dutch Missionary Society (Holland), 1858; the Salvation Army, 1880; the Seventh-day Adventist Society (U. S.), 1889; the Woman's Board (U. S.), connected with the American Board, which was the pioneer of the numerous woman's boards connected more or less closely with almost all the general boards, 1868; the Volunteers of America (U. S.), 1896.

In 1908 the amount contributed in the U. S. for missions was \$10,061,433; and in Great Britain, \$9,265,447. The missionaries supported by the various societies in the U. S. aggregated 6,611, with 29,115 native helpers; Great Britain supported 8,328 missionaries and 46,559 native workers.

Mississippi (named from Mississippi River), popular name, BAYOU STATE; state flower, magnolia; state in the S. central division of the American Union; bounded N. by Tennessee, E. by Alabama, S. by the Gulf of Mexico and Louisiana, W. by Louisiana and Arkansas, from which it is separated by the Mississippi River; area, 46,865 sq. m.; pop., census of 1910, 1,797,114, including over 1,000,000 negroes; capital, Jackson; principal cities and towns: Vicksburg, Meridian, Natchez, Jackson, Greenville, Columbus, Biloxi, Yazoo, McComb,



Hattiesburg, Water Valley, Aberdeen, Canton, Wesson, West Point, Laurel, Greenwood. The highest land lies in the NE., and from thence it slopes gradually to the Mississippi River and the Gulf of Mexico. Running N. and S. through the center of the state is a broad low ridge, which divides the tributaries of the Mississippi from those of the Pearl, Tombigbee, and Pascagoula. W. of this watershed the country is broken up by several narrow ridges and valleys of denudation which finally fall away into the Yazoo delta. E. of the central ridge are vast prairies of exceeding fertility. On the tableland constituting the ridge are immense forests and much cultivated land. In the pine-woods region in the S. portion of the

state the land is rolling. Thus, while there are no high elevations, the land is generally rolling and much broken, and in some places the ridges rise to the height of 800 ft. The state is mainly drained by the Mississippi and its tributaries, the Big Black, Homochitto, and the Yazoo, with its affluents, the Sunflower and the Tallahatchie. The Tombigbee flows through the E. portion of the state, while the Pearl with its tributaries, and the Pascagoula, with the Chickasawha, drain the SE. In the extreme NE. the Tennessee separates the state from Alabama for 15 m.

The summer season is long and hot, but generally healthful, except in the Yazoo delta region. The temperature rarely reaches 98°, the normal mean temperature for the summer months being 80.1°. The winters, comparatively short, are damp and somewhat colder than in the corresponding latitude on the Atlantic coast. Along the gulf coast the temperature seldom falls below 28°. The average rainfall for the state at large is about 56 in., with a fall of 62 in. near the S. coast, and a little less than 54 in. in the N. portion. The most fertile land is the Yazoo delta, an elliptical body in the extreme W. portion of the state, extending N. from Vicksburg. E. of this is a belt running N. and S., known as the bluff formation and brown-loam tablelands, that is nearly as fertile as the Yazoo delta. The NE. prairie region, with its rich, black, calcareous soil, has always been noted for having many of the best farming lands of the state, and during the Civil War was known as the "Egypt of the Confederacy." Except the pine lands in the extreme S. portions of the state and the yellow-loam lands in the N. central portion, the soils are unusually rich in plant food. Among the more common fruits are the grape, apple, peach, pear, plum, and apricot. Thousands of acres are used for the cultivation of strawberries and tomatoes. In the S. counties figs, oranges, olives, and other semitropical fruits flourish. The Yazoo delta is renowned as the best cotton land in the world, and the state stands fourth in the Union in the production of this staple. The NE. portion is especially adapted to the growing of cereals, grasses, clovers, and other forage crops; and the farmers of this section are largely engaged in stock raising and dairying.

Mineral products include lignite or brown coal, lime, rough sandstone, pipe clay, potter's clay, firebrick clay; there are many mineral springs, some of high repute; value mineral (including clay) products (1910), \$840,152; production of cotton, 627,209,500 lbs. of upland cotton, valued at \$88,830,000, and 561,000 tons of seed, at \$16,100,000; other crops: corn, 54,150,000 bu. in 1911; rice, wheat, oats, potatoes, and hay (150,000 tons in 1911); capital invested in 2,598 manufacturing establishments (1909), \$72,393,000; value of output, \$80,555,000.

Notable educational institutions are the State Univ., Agricultural and Mechanical College, Millsaps College (Methodist Episcopal), Industrial Institute and College for White Girls (State), Mississippi College (Baptist), Whitworth Female College (Methodist Episcopal

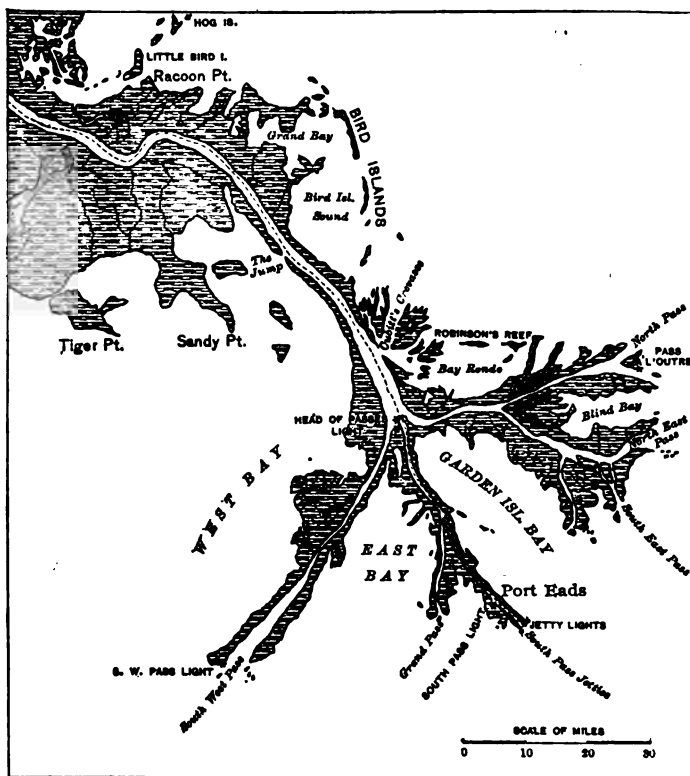
South), colleges for women at Blue Mountain, French Camp, Jackson, Meridian, Natchez, Pontotoc, and Port Gibson; several separate normal schools for white and colored students and for the colored race; Rust Univ. (Methodist Episcopal), Tougaloo Univ. (Congregational), Central Mississippi College (Baptist), Alcorn Agricultural and Mechanical College (nonsectarian), Mary Holmes Seminary (Presbyterian), Jackson College (Baptist), and Southern Christian Institute (Christian).

Hernando de Soto was the first European to enter the limits of the present state. Marquette and Joliette, French explorers, passed down the Mississippi to the mouth of the Arkansas, 1673, while La Salle descended to the Gulf, 1682, gave the country the name of Louisiana, and claimed all the region drained by the great river and its tributaries for the King of France. The first colony established was that of D'Iberville at Biloxi, 1699. The Louisiana colony was a royal province until 1712; was under the proprietorship of Crozat, a wealthy French merchant, 1712-17; under the West India Company, 1717-32; then, until 1763, when it was ceded to the English, was a royal province, called British W. Florida. Part was ceded to the U. S., 1783; in 1800, Mississippi became a territory; in 1817, it was admitted as a state, and Alabama Territory was set off. Mississippi passed an ordinance of secession, January 9, 1861, and was not readmitted to the Union till February 24, 1870. In or near her borders, during the Civil War, were fought the fierce battles of Shiloh, Iuka, Corinth, Chickasaw Bayou, Port Gibson, Champion Hills, Vicksburg, Harrisburg or Tupelo, and Brice's Cross Roads.

Mississippi River (Indian, "Great River"), river of N. America; popularly called the Father of Waters; discovered by De Soto, 1541. It drains a territory of 1,246,000 sq. m., or the greater part of the U. S. between the Alleghany and Rocky Mountains. The mean annual rainfall over the whole basin is 30½ in. It has eight principal tributaries, which are, in the order of the extent of the regions drained by them, the Missouri, Ohio, upper Mississippi, Arkansas, Red, White, Yazoo, and St. Francis. Taken in connection with the principal tributary, the Missouri (which should have been considered the extension of the parent stream), it is one of the longest rivers

in the world, the distance from the headwaters of the Missouri to the mouth of the Mississippi being 4,200 m. The Mississippi has its source in the N. part of Minnesota, the stream having been traced to springs about 6 m. from Lake Itasca in lat. 47° 14' N. and lon. 95° 15' W. Its length is 2,800 m., although the direct line distance from its source to its mouth in the Gulf of Mexico is but about 1,660 m. The Falls of St. Anthony at Minneapolis mark the head of navigation.

Above the mouth of the Missouri there are many islands, and the total width of the Mis-



MISSISSIPPI DELTA.

issippi is about a mile as high up as Lake Pepin. This is an expansion to the width of 2 to 3 m. for a distance of about 20 m., not far below the head of navigation. Below the mouth of the Missouri the width reduces to from ½ m. to 1 m., an average retained as far down as Red River; but occasionally the river widens out as much as 1½ m. From Red River to the mouth the width averages but little over ½ m., and is quite uniform. Below the mouth of Red River the depth is always sufficient for navigation, but above that point there is more or less trouble at low stages. Below the mouth of the Missouri the river is always very highly charged with sediment of a yellowish appearance. A large proportion by weight of this sediment is very fine sand. It is probable that the mean annual discharge of the river is about 21,000,000,000,000 of cu. ft., or sufficient to

cover the whole Mississippi basin to a depth of $7\frac{1}{4}$ in.; in other words, one fourth of the rainfall over the basin passes off to the Gulf at the mouth of the river. The mean velocity of the flow is from 1 to 6 m. per hour for different stages and sections.

Below the mouth of Red River the Mississippi is divided into numerous arms or passes, each of which pursues an independent course to the Gulf. The Atchafalaya River, in Louisiana, has at high water a connection with the Mississippi. Below its point of separation from the Mississippi, the region of swampy lands, of bayous and creeks, is known as the delta. Above this the alluvial plain of the river extends to the Chains, 30 m. above the mouth of the Ohio, and to Cape Girardeau, Mo., where precipitous rocky banks are first met with. The total length of the plain from the mouth of the Ohio to the Gulf is estimated at 500 m. Its breadth at the upper extremity varies from 30 to 50 m. The extreme width of the delta is rated at 150 m., its average width is probably 90 m., and its area, 12,300 sq. m. The elevation of the bottom lands at Cairo above sea level is about 310 ft., while the slope of the high-water surface from that place to the Gulf is from 322 to 0. These bottom lands are subject to inundation, and are protected by levees, the breaking of which has frequently caused immense loss. The alluvial plain is terminated on the E. and the W. by a line of bluffs of irregular height and direction. The range between high and low water at Cairo, near the head of the plain through which the river flows, is 51 ft., and at New Orleans, 14.4 ft.

On the upper river (above the mouth of the Ohio) the greatest floods come in April, May, or June. On the lower river they come in February, March, or April, and come mostly from the Ohio River. The delta rises a few inches to 10 ft. only above sea level. It protrudes into the Gulf of Mexico far beyond the general coast line, and is slowly but imperceptibly advancing into the Gulf by the shoaling caused by the deposition of the sediment brought down the river. This is mostly dispersed by the waves and currents, and distributed over the bottom of the Gulf. The river enters the Gulf by six channels or passes. Owing to shifting bars, navigation of some of these is often difficult. The jetties at the mouth of the South Pass provide a navigable channel about 30 ft. deep at all seasons. See JETTIES.

Mississippi Scheme. See LAW, JOHN.

Missolonghi, or **Mesolonghi** (mis-sō-lōn'gē), town of Greece; in government of Ætolia; on the Gulf of Patras; is well fortified, and famous for the valor with which it twice met the besieging Turks during the War of Independence, 1822 and 1826. Lord Byron died here. Pop. (1896) 8,394.

Missou'ri (named from Missouri River), popular names, **BULLION STATE**, **IRON STATE**; state flower, golden-rod; state in the N. central division of the American Union; bounded N. by Iowa, E. by Illinois, Kentucky, and Tennessee, from which it is separated by the Mississippi; S. by Arkansas, W. by Indian Ter-

ritory, Kansas, and Nebraska; extreme breadth, E. to W., 318 m.; average breadth, 244 m.; area, 69,420 sq. m.; pop., census of 1910, 3,293,335, including over 157,000 negroes; capital, Jefferson City; principal cities and towns: St. Louis, Kansas City, St. Joseph, Joplin, Springfield, Sedalia, Hannibal, Jefferson, Carthage, Webb, Moberly, St. Charles, Nevada, Independence, Chillicothe, Aurora, Kirksville, Columbia, De Soto, Brookfield, Trenton, Louisiana, Mexico, Marshall, Clinton. The Missouri River crosses the state from W. to E. The portion S. of the river is of very varied surface, the SE. portion being low and partially swampy; above this, on the Mississippi, the highland bluffs begin and extend to the mouth of the Missouri. In the SW. portion the Ozark



Mountains—or rather hills—render the whole region exceedingly broken and hilly, the isolated peaks sometimes rising from 500 to 1,000 ft. above their bases, and then sinking into very beautiful and sometimes fertile valleys.

The numerous river bottoms and valleys formed by the tributaries of the Osage and Missouri rivers are moderately fertile, but they are generally subject to overflow. Farther N., in the basin of the Osage and above it, the land is mostly rolling prairie, with occasional forests; the immediate valley of the Missouri has a rich alluvial soil, and abounds in large forest trees. The Missouri forms the W. boundary of the state for nearly 200 m., and, turning E. at the mouth of the Kansas, flows in an ESE. direction across the state; then, flowing NE., enters the Mississippi 20 m. N. of St. Louis. The Little River, which crosses the S. boundary of the state before entering the Mississippi, and the Meramec, are the only considerable streams discharging their waters into the Mississippi S. of the Missouri. N. of that river Salt River is the largest of these tributaries, but the Cuivre or Copper River, Perruque or Wig Creek, Dardenne Creek, Fabius, Wyaconda, and Little Fork rivers are streams of moderate size. The Missouri receives numerous large affluents in the state; on the S. side are Lamine River, Osage River, and its tributary, the Little Osage, Sac River, Grand River, Pomme de Terre River, Big Niangua, Auglaize, Maries Creek, and Gasconade River; on the N. side,

the Nishnabotona, Nodaway, Platte, Grand, Chariton, Roche Perce (now known as Perche), Cedar, and Loutre rivers, and Yellow Creek.

The climate is generally healthful, excepting in the river bottoms and the swampy districts of the SE., but subject to great extremes; summers long and hot; winters very cold, with strong and piercing winds; mean temperature in January for a given year, 25.5°; in July, 77.3°; average rainfall in same months, 0.45 in. and 4.91 in. The soil is divisible into five classes: (1) The alluvial deposits of the SE. part and of the bottoms of the Missouri, which are exceedingly fertile; (2) the black-soil prairies of the NW. part; (3) the part prairie and part rolling land of the E. part, N. of the Missouri, which contains the best tobacco lands of the state; (4) a good fruit, wheat, and corn tract in the SW. part; (5) the extensive tract between the SW. part and the swampy lands in the SE., which contains heavily timbered hills and some very rich valleys. Most of N. and NW. Missouri is prairie, though with belts of timber along the streams. Principal mineral productions: Lead and zinc ore, bituminous coal, limestone and dolomite, iron ore, siliceous crystalline rock, potter's clay, barytes, sandstone, quartzite, natural gas, glass sand; value products (1910), excluding iron ore, \$52,640,054; including clay products, \$7,087,766, and coal, \$5,328,285. Farm products (1911): Corn, 192,400,000 bu.; wheat, 36,110,000 bu.; oats, 17,760,000 bu.; barley, rye, flaxseed, potatoes, hay, tobacco, and cotton. Principal manufacturing industries: Malt liquors, foundry and machine-shop products, clothing, lumber and timber products, tobacco, slaughter-house products, flour and grist-mill products, factory-system manufacturing plants (1909), 8,375; capital employed \$444,343,000; value products, \$574,111,000.

The higher educational institutions include the State Univ., Columbia, with its School of Mines at Rolla; Washington Univ. (nonsectarian), St. Louis; St. Louis Univ. and Christian Brothers College (both Roman Catholic), St. Louis; Missouri Wesleyan College (Methodist Episcopal), Cameron; Christian Univ. (Christian), Canton; Jewell College (Baptist), Liberty; Park College (Presbyterian), Parkville; Drury College (Congregational), Springfield; Tarkio College (United Presbyterian), Tarkio; normal schools at Warrensburg, Cape Girardeau, and Kirksville; and secondary schools for the colored race, George R. Smith College (Methodist Episcopal), Sedalia, and Lincoln Institute (nonsectarian), Jefferson City. The present State of Missouri was known as Upper Louisiana. Under this name its lead mines began to be known as early as 1720, and settlements were made not long after at St. Louis, Cape Girardeau, and (probably abt. 1735) at Ste. Genevieve. In 1763 it was ceded to Spain with the rest of the Louisiana or Mississippi River country, while all E. of the river came into the possession of the English.

In 1800 Spain ceded her provinces on the Mississippi to France, and the French Govt. sold them to the U. S., 1803. The U. S. Govt. divided the purchased region into the Territory of Orleans and the District of Louisiana, the

latter including most of Arkansas, Missouri, Iowa, Minnesota, and Dakota, and most of Kansas and Nebraska. On March 10, 1804, Capt. Amos Stoddard, of the U. S. army, succeeded Delassus, Spanish commandant at St. Louis, and the authority of the U. S. in Missouri dates from that day; during the same year this region was erected into the Territory of Louisiana, and St. Louis made the capital. In 1812, Louisiana becoming a state, the name of the territory was changed to Missouri Territory. In 1817 the territorial legislature applied to Congress for liberty to prepare a state constitution preliminary to admission into the Union. This application led to a protracted struggle in Congress on the question of the admission of Missouri as a slave state. It was finally settled by the Missouri Compromise. The state was admitted to the Union, August 10, 1821. The people of the W. portion of the state, 1858-59, took sides in the Kansas troubles, and armed bodies of men, known as Missouri "border ruffians," penetrated into Kansas and committed many outrages there. A convention was called in Missouri on February 28, 1861, which decided in favor of remaining in the Union. A constitutional convention met in St. Louis, January 6, 1865, and adopted a new constitution, providing for emancipation and the changes induced by it. This was further modified in 1870, and a new one adopted, 1875.

Missouri Com'promise, name given to a law of Congress which is one of the principal landmarks of the history of the U. S. during the nineteenth century. On the introduction into Congress, in the session of 1818-19, of a bill providing for the admission of Missouri as a state, but prohibiting slavery therein, the opposition on the part of the Southern members became violent and menacing, and a compromise was effected, chiefly by the influence of Henry Clay. Missouri was admitted as a slave state, and at the same time an ordinance was enacted, February 28, 1821, that from all the territory W. of Missouri and N. of the parallel of 36° 30' (the S. boundary of the new state) slavery should be forever excluded. This agreement subsisted until virtually repealed by the bills which established the territories of Kansas and Nebraska, 1854, when the question, thus reopened, became the cause of civil war in Kansas between the partisans of liberty and slavery. This measure determined the formation of the Republican Party, 1854, precipitated the antislavery issue, and led to the Civil War of 1861-65.

Missouri River, principal tributary of the Mississippi River; is formed in SW. Montana by the union of the Jefferson, Madison, and Gallatin rivers; flows N. and E. through Montana; then in a SE. direction traverses N. and S. Dakota, and flows between Nebraska and Kansas on the W. and S. Dakota, Iowa, and Missouri on the NE. and E. until it reaches Kansas City, whence it flows E. through Missouri to its junction with the Mississippi, 20 m. above St. Louis. Its length to the source of the Madison River, which rises in National Park, is about 3,000 m. It is a turbid and

swift stream, navigable in high water to Fort Benton, Mont., or even to the Great Falls, and in low water to the mouth of the Yellowstone, near the boundary between N. Dakota and Montana. The Great Falls are 40 m. above Fort Benton. They consist of four cataracts separated by rapids, with a total fall of 357 ft. in 16½ m. About 145 m. above this point the river passes through the Gate of the Rocky Mountains, a gorge with perpendicular walls rising 1,200 ft. directly from the edge of the stream, and extending thus for a distance of nearly 6 m. Its chief tributaries are the Milk, Dakota, Big Sioux, Little Sioux, and Grand on the left, and the Yellowstone, Little Missouri, Cheyenne, White, Niobrara, Platte, Kansas, and Osage on the right.

Missouri, University of, coeducational institution at Columbia, Mo.; founded, 1839; academic department opened, 1841; normal, 1867; College of Agriculture and Mechanic Arts and School of Mines and Metallurgy (latter at Rolla), 1870; law, 1872; medicine, 1873; engineering, 1877; and Agricultural Experiment Station, 1887. It had (1910) 162 professors and instructors, 2,362 students in all departments, scientific apparatus valued at over \$440,000, grounds and buildings, \$1,740,000, and productive funds, \$1,250,000.

Mist. See Fog.

Mistake', in law, an unintentional act or omission having legal consequences (*mistake of fact*), or an intended act or omission having unintended legal consequences (*mistake of law*). It is a fundamental principle of law that no man shall avail himself, either to establish or resist a claim, of his mistake or ignorance of law. So also in criminal law it is an ancient maxim: *Ignorantia legis neminem excusat*. Ignorance of the law excuses no one. But the law distinguishes most carefully between a mistake of law and a mistake of fact; and the latter, as a general rule, is rectified, and all mischievous consequences prevented, as far as possible. To the general rule there are some important qualifications; the principal one being, that no mere acknowledgment, or waiver of defense or right, made under a mistake of law, is binding. In many cases also much relief is to be obtained by the construction of a contract. It may be regarded as the established rule concerning mistakes, that any mistake in an instrument may be corrected by construction, if the instrument itself affords the means of correction; but not if it can be done only by going outside of the instrument. Courts of equity, however, have large powers to reform conveyances and contracts where by mistake in drafting them they are made to express a different intent from the one agreed upon.

Mistassini (mīs-tās-sē'nā), lake of Labrador, in lat. 51° N., lon. 72° W., just N. of the "Height of Land" or watershed and on the Hudson Bay versant. It receives considerable drainage from the N., and empties, through Rupert River, 120 m. long, into James Bay. It is of very irregular form, with many long islands running NE. and SW. Reports of its

size vary much, but an exploring expedition, 1884, found it about 100 m. long and only 13 or 14 broad, while at some points it had great depth. A smaller lake lies parallel to it and not far to the E.

Mistletoe, parasitic dicotyledonous shrub, of the family *Loranthaceae*, with opposite leaves, reduced dioecious flowers, and a single inferior one-celled ovary. The mistletoe of the Old World is *Viscum album*, a common parasite on apple trees in England, rarely on oaks.



MISTLETOE (*Viscum album*).

The yellowish-green foliage is in great demand for Christmas decoration. The American mistletoe resembles the foregoing, but belongs to the genus *Phoradendron*. One species (*P. flavesces*) is common from New Jersey to S. Indiana, Missouri, and to the S., on many trees, forming pale-green clumps from 2 to 4 ft. in diameter. This species is used for Christmas decorations in the U. S.

Mistral (mēs-träl'), Frédéric, 1830-1914; French Provençal poet; b. Maillane, Bouches-du-Rhône; son of a peasant; began to study law, but abandoned it for the farm; undertook writing in the dialect of S. France; with seven others founded the Society of the Felibrige, 1854; published his first work, the epic "Mireis," 1859, which was awarded the poetic prize of the French Academy, 1861, and gained the cross of the Legion of Honor for its author. Later works include a second epic, "Calendau," a volume of poems, "Lis Iselo d'Or" ("Golden Islands"); a novel, "Nerto"; and a dictionary of the Provençal dialect.

Mistral (mīs-träl'), norther or land wind on the S. shore of France, cold, dry, gusty, and sometimes violent, injurious to vegetation, and hard to endure. It is most frequent and violent in winter, and is felt along the coast from the mouth of the Ebro to the head of the Gulf of Genoa, but it extends inland and becomes most violent in Provence and Languedoc, especially over the delta of the Rhône. In the lower Rhône Valley it occurs every two or three days, and at Marseilles it blows on the

average one hundred and seventy-five days in the year. It is so violent as sometimes to overturn railway trains. It resembles the Bora of Istria and the norther of Texas.

Mitch'el, John, 1815-75; Irish patriot; b. Dungiven, Derry; practiced law for several years; edited the *Dublin Nation*; started and edited *The United Irishmen* in the interest of the Young Ireland Party; was arrested, convicted of felony, and transported for fourteen years; escaped and went to New York, where he started *The Citizen*; edited the *Richmond Enquirer* during the Civil War; returned to Ireland and elected to Parliament, 1874; declared ineligible and reelected, but died before his case was settled. He published "Hugh O'Neill," his own "Jail Journal," "The Last Conquest of Ireland" (perhaps), and a continuation of MacGeoghegan's "History of Ireland."

Mitchel, Ormsby MacKnight, 1810-62; American astronomer; b. Morganfield Co., Ky.; graduated at West Point, 1829; Assistant Prof. of Mathematics there, 1829-31; resigned, 1832; was admitted to the bar; Prof. of Mathematics and Astronomy, Cincinnati College, 1834-44; Director Dudley Observatory, Albany, N. Y., 1859-61; reentered the army as brigadier general of volunteers; promoted major general and given command of the Department of the South, 1862; died of fever a few months afterwards. The great work of his life was the stimulus given to astronomy by his popular lectures, which were the direct cause of the establishment of observatories at Albany, Clinton, and Allegheny City. He invented a chronograph for automatically measuring and recording right ascensions by electro-magnetic mechanism, and a declinometer, or apparatus for the accurate measurement of large differences of declinations.

Mitch'ell, Donald Grant (pen name **IK MARVEL**), 1822-1909; American author; b. Norwich, Conn.; studied law; U. S. consul at Venice, 1853-54; subsequently lived on a farm at Edgewood, Conn.; best known by his "Reveries of a Bachelor."

Mitchell, Maria, 1818-89; American astronomer; b. Nantucket, Mass.; daughter of William Mitchell, whom she early aided in his astronomical studies; gave special attention to study of nebulae and of comets; received, 1847, a gold medal from the King of Denmark for the discovery of a comet; was afterwards employed on the U. S. Coast Survey and *The Nautical Almanac*; Prof. of Astronomy in Vassar College, 1865-88; received degree of LL.D. from Columbia Univ., 1887; member of many learned bodies.

Mitchell, Sir Thomas Livingstone, 1792-1855; British engineer; b. Stirlingshire, Scotland; became a major in the army; 1827 was appointed deputy surveyor general of E. Australia, and ultimately surveyor general. Between 1831 and 1846 he conducted four expeditions into the interior of Australia; discovered Mt. Bynna, the vast region called Australia Felix, the Red, Peel, Nammoy, and

Victoria rivers; explored the courses of the Darling and Glenelg rivers; and mapped out a practicable route between the colonies of Victoria and S. Australia.

Mit'ford, Mary Russell, 1786-1855; English author; b. at Alresford, Hants; published in early life some volumes of poems, and then became a successful and highly popular prose writer. The greater part of her life was spent near Reading. Her principal works are "Our Village," a series of pleasant sketches; "Bedford Regis," "Country Stories," "Recollections," "Atherton and Other Tales," and a number of dramas, of which "Riezi" was the most successful.

Mith'ras, originally the Persian god of light, who was afterwards identified with the sun god. As such he was the god of wisdom as well as of everything good, and overcame the demons of darkness and of evil. By degrees he became the chief god of the Persians, though in most ancient times he was not so reckoned. In Roman times his cult was introduced into Greece and Rome, chiefly through the pirates whom Pompey conquered. Mysteries were connected with the worship of Mithras. The intransigent had to pass through eighty degrees of trial before he could be initiated into the mysteries. In numerous works of art Mithras is represented as a young man in Asiatic costume kneeling on the back of a prostrate bull, whose head he pulls back with his left hand, while with his right he plunges a sword into the bull's breast.

Mithrida'tes, Persian name common throughout the Orient. It was the name borne by most of the kings of Pontus.—**MITHRIDATES I** (337-302 B.C.) submitted to Alexander the Great, and was killed by Antigonus.—**MITHRIDATES II** (302-286 B.C.) withstood the successors of Alexander, and increased the kingdom.—**MITHRIDATES III** fought the Gauls.—**MITHRIDATES IV** conquered and annexed Sinope.—**MITHRIDATES V**, Euergetes (156-121 B.C.), received a great part of Phrygia from the Romans for service rendered in the third Punic War.—**MITHRIDATES VI**, surnamed **EUPATOR**, or more generally **THE GREAT** (121-63 B.C.), b. at Sinope, the capital of the kingdom, 134 B.C.; succeeded his father, 121 B.C.; conquered during the first period of his reign the territories along the N. coast of the Euxine as far as Chersonesus Taurica; incorporated the kingdom of Bosphorus farther to the W.; turned then to the countries S. of the Euxine, attacked Cappadocia and Bithynia, and met here with the Romans. Three wars ensued, known in the history of Rome as the Mithridatic wars—namely (1) 88-85 B.C. (2) 83-82 B.C.; and (3) 74-66 B.C. They are described under Sulla, Lucullus, and Pompey, and ended with the complete defeat of Mithridates, who retreated behind the Euxine, and killed himself at Panticapæum, where he was besieged by his own son, Pharnaces, 63 B.C.

Mito (mē'tō), old town and clan of Japan; province of Hitachi and prefecture of Ibaraki; 7 m. inland from the Pacific. The castle, a most picturesque spot, has not been disman-

tled, but the inclosure is now devoted to educational purposes. During the civil war of the restoration it was the scene of severe fighting, traces of which remain. Mito was ruled by a succession of able princes closely allied by blood to the Tokugawa shoguns, to whom they supplied regents in the case of a minority, and in some cases heirs, the last shogun, Keiki, being a son of the lord of Mito. It was and is a center of Confucianism and conservatism. Pop. (1903) 36,928.

Mitrailleuse (mă-tră-yéz'). See **MACHINE** AND **RAPID-FIRE GUNS**.

Mitré (mă'tră), Bartolomé, 1821-1906; Argentinian military officer and statesman; b. Buenos Aires; on account of some patriotic poems was forced to emigrate; served in the army of Bolivia as chief of staff; for refusing to join in the revolution of 1847 was banished, and became editor of *El Mercurio*, a paper published at Valparaiso, Chile; on account of opposition to the government was banished, and, 1851, went to Peru. He led the movement by which Buenos Aires declared itself independent, 1852; was made Minister of War and commander in chief of the forces, 1859; but was defeated by the dictator Urquiza, and Buenos Aires was forced to reënter the Argentine Confederation. He was made Governor of Buenos Aires, and when Urquiza marched against him, 1861, defeated him at Pavon. Mitré was president of the Argentine Republic, 1862-68; commander in chief of the forces in the Paraguayan War; appointed minister to Brazil and Paraguay, 1873; was a presidential candidate, 1874, and being defeated headed a revolution, but was defeated, and lived in exile until 1875. During his administration the country made rapid progress, and his enlightened measures caused him to be styled "the Argentine Gladstone." He was the founder of *La Nacion*, the best of the dailies published in Buenos Aires, and author of "Life of General San Martin," "History of the Generals of the Latin-American War of Independence," etc.

Mitre, ornament worn on the head by certain ecclesiastics of the Roman Catholic and Greek churches, consisting of a stiff cap rising in two points, one before and the other behind, and having two ribbonlike pendants which fall on the shoulders. Three kinds of mitres are used in the Roman Church: the precious mitre, often made of gold or silver and adorned with gems; the gold-embroidered



BISHOP'S MITRE.

mitre, made of cloth of gold or white silk embroidered with gold; and the plain mitre, of white damask or linen, with red edging or fringe on the lappets. Cardinals, abbots of great houses by special papal privilege, and canons of highly favored cathedrals or royal collegiate churches, are allowed to wear the mitre.

Miv'art, St. George, 1827-1900; English naturalist; b. London; admitted to the bar, 1851, but devoted himself to science; Lecturer on Comparative Anatomy and Zoölogy, St. Mary's Medical School, London, 1862-84; Prof. of Biology, Catholic University College, Kensington, 1874-77; of the Philosophy of Natural History, Univ. of Louvain, Belgium, after 1890; was widely known as an opponent of certain features of the Darwinian theory, denying that evolution is applicable to the human intellect; chief works "Genesis of Species," "Man and Apes," "Contemporary Evolution," "Origin of Human Reason."

Mixed Mathemat'ics. See **MATHEMATICS**.

Mnemonics (nē-môn'iks), artificial systems intended to aid the memory. They were highly esteemed in antiquity, attracted much attention after the revival of learning, and still claim a share of popular interest. The systems depend on associations, usually of an artificial sort. The plan commonly used by the Greeks and Romans was to select a real or imaginary house, and impress on the mind the different rooms, with their walls, windows, furniture, etc. In preparing a discourse each part (cf. the phrase "in the first place") was associated with a given room, and the subdivisions, etc., with the parts of the room; then the orator in delivering the discourse would imagine himself going through the rooms and seeing the parts with which he had associated his headings. Houses were also set apart for memory of different classes of facts, and symbols were "stored" up in them. Then the houses were combined to make a street or town. A different plan, approved by Winckelmann and Leibnitz for the memory of dates, etc., is to associate letters with the numbers. The letters, usually consonants, corresponding to the numbers, are made into real or meaningless words by the addition of other letters, and the words are associated with the fact to be remembered. Thus, if it be desired to remember that printing was invented about 1436, according to one system, 1=t, 4=r, 3=m, and 6=g, and the combination *tremengous* can be formed and associated with printing because it was such an important discovery.

Other systems consist of memorizing series of images, and especially memorial rhythms which are associated with the facts to be remembered. Or intermediate or additional associations, often of an absurd or startling character, are added. Systems of mnemonics will doubtless enable "the victims" to call up disconnected dates and facts which it might not otherwise be possible to remember; but it may well be doubted whether it be any advantage to keep such things in mind. There are some cases (e.g., the number of days in the months and the rhythm, "Thirty days hath September, April, June, and November") where an artificial aid may be worth the while, but the elaborate systems which have been proposed would seem to crowd the mind with useless furniture and interfere with logical and judicious memory. Bacon compared the feats of memory which can be performed by such

systems with the exhibitions of rope dancers, which may "cause admiration," but "cannot be highly esteemed." True methods for cultivating the memory are logical ways of conceiving, classifying, and analyzing facts, and connecting them with central and permanent interests.

Mnemosyne (nē-mōs'ī-nē), goddess of memory, one of the Titanides, daughter of Uranus, who became by Jupiter the mother of the Muses.

Mnevis (nē'vīs), sacred ox or bull of Heliopolis, probably dedicated to the sun god, Ra, as was the city, or possibly to Osiris as Osiris-Mnevis. His cult is supposed to have been similar to that of the Apis bull at Memphis, and to have furnished the prototype of the golden calf worshiped by Israel in the desert (Ex. xxxii).

Mo'abites, descendants of Moab, son of Lot by his eldest daughter (Gen. xix, 37). An idolatrous people, they were hostile to the Israelites, in spite of the relationship between them. The S. boundary of the Moabites was the brook Zered (the modern Wady el-Ahsey), which empties into the SE. corner of the Dead Sea. Their territory was about 20 m. from E. to W., and at one time extended as far N. (50 m.) as the mountains of Gilead. At the time of the Exodus they had lost about 30 m. of territory, having been driven S. of the Arnon by the Amorites. Subdued by David, they regained their independence after the dismemberment of the Hebrew kingdom; aided Nebuchadnezzar (604-561 B.C.) against the Jews (II Kings, xxiv, 2) and rejoiced in their overthrow (Ezek. xxv, 8-11; Zeph. ii, 8-10), which conduct induced the prophetic denunciations of Isaiah (xv, xvi, xxv, 10), Jeremiah (xxv, 21; xlviii), and Amos (ii, 1-3), all of which were fulfilled, for they soon after disappear from history.

Mo'abite Stone, block or slab of black basalt, inscribed with thirty-four lines of Hebrew-Phœnician writing, found, 1868, at Dhiban (ancient *Dibon*), just N. of the Arnon, a river flowing into the Dead Sea. It celebrates the achievements of one of the Moabite kings, Mesha (abt. 900 B.C.), and his wars with Omri and other kings of Israel. The inscription proves that the Greeks added nothing to the alphabet which was brought to them from the East.

Mobile (mō-bēl'), capital of Mobile Co., Ala., and only port of entry in the state; on the Mobile River, near its entrance into Mobile Bay; 30 m. N. of the Gulf of Mexico; is built on a sandy plain rising from the river's bank, while in the suburbs are several attractive hills, on which are many costly residences. Mobile exports cotton, naval stores, lumber, rosin, turpentine, iron, coal, machinery, and Western foodstuffs, and imports chiefly tropical fruits, sisal grass, and wood; value exports for year ending June 30, 1911, \$30,154,037; imports, \$4,031,737; bales of cotton exported, 185,323. Vessels drawing 23 ft. of water are admitted to the wharves. There are numerous

lumber, sash, and blind factories; cotton and cottonseed-oil mills, flour and grist mills, foundries, factories of beer, tobacco, cordage, and cedar pencils. Ship and boat building is an important industry, as is market gardening. The city has the Cathedral of the Immaculate Conception, a Jesuit college at Spring Hill, Barton Academy, U. S. Marine Hospital, a port hospital, U. S. Govt. building, the Medical College of Alabama, and a cotton exchange.

Mobile was founded 1702; capital of the province of Louisiana till 1720; captured from the English by the Spanish, 1780; occupied by U. S. troops, 1813; incorporated as a city, 1819; name changed to Port of Mobile, 1870; rights of municipal government restored, 1887. Early in the Civil War Forts Morgan and Gaines, at the entrance of the bay, were garrisoned by the Confederates and the city was strongly fortified. On August 5, 1864, Admiral Farragut ran past the forts with his fleet into the Bay, and destroyed and captured the Confederate fleet. The forts soon after surrendered. Spanish Fort and Blakely, fortified places in the vicinity, having been carried by assault by the Union forces on April 8 and 9, 1865, exposing the city to attack from the river, it was evacuated by the Confederates on the 11th, and occupied by the Union troops next day. Pop. (1910) 51,521.

Mobile Point, apex of a long, low, narrow, sandy peninsula between the Gulf of Mexico on the S. and Bon Secours Bay and Navy Cove on the N. It is the E. limit of the entrance into Mobile Bay, and the site of Fort Morgan, built in the place of Fort Bowyer, which repelled an attack by the British, September 14, 1814. After the battle of New Orleans, Fort Bowyer was invested by the whole British force, and Major Lawrence, its commander, surrendered, February 12, 1815.

Mobile River, stream formed by the confluence of the Alabama and Tombigbee rivers. A few miles below the junction it divides into two branches, of which the E. is called Tensas, and both branches subdivide into several others, which meet in a common embouchure at the head of Mobile Bay; total length of the river proper, 50 m. The city of Mobile is on its W. bank.

Moc'casin, very venomous serpent of the S. U. S., found in swamps and wet places, and even in water; is 2 ft. long, dark brown above and gray beneath; scientific name, *Ancistrodon* (*Toxicophis*) *piscivorus*. The name mocassin is also given to the copperhead (*A. contortrix*).

Mocha (mō'kā), town in province of Yemen, Arabia; on the Red Sea; has a strongly fortified harbor, and is the most celebrated coffee market in the world. Mocha is a comparatively modern city, probably much later than the establishment of Islamism. Pop. abt. 5,000.

Mocha Stone, or Moss Ag'ate. See CHALCEDONY.

Mock'ing Bird, singing bird (*Mimus polyglottus*) of the family *Turdidae*, found in the warmer parts of N. America. Its general color is ashy brown above, white below, with the

outer tail feathers and bases of primaries white. It is a rare summer visitant in the more N. states. The mocking bird is reputed to be the



MOCKING BIRD.

best American songbird. Besides its own delightful song, it imitates the notes of most other birds. It readily learns to whistle tunes, but not to talk.

Mode, or Mood. See **VERB**.

Mode, in modern music, a certain scheme or arrangement of sounds in direct order from low to high, or vice versa, under which they are recognized by the ear as forming a complete and conclusive series extending over eight degrees, and having a distinctly marked beginning, progress, and ending. If the eight principal sounds comprised in the octave were *equidistant*, there could be only one such mode or system, inasmuch as a series of notes commencing on D or E, etc., would differ only in point of pitch (not in quality) from another series commencing on B or C; but as it is, we find in the octave five whole tones and two *semitones*; and it is also essential that these tones and semitones shall fall into a certain order to render the scale available in modern music. That order may be twofold—*viz.*, major and minor—and these two forms of scales constitute the two *modes* now in use, the third above the tonic being in the one case major and in the other minor.

Modena (mōd'ā-nā), ancient *Mutina*, capital of the former Duchy of Modena, Italy; 23 m. NW. of Bologna; in a low but healthful plain between the Secchia and the Panaro, with which rivers it is connected by canals; is also connected with the Po and Adriatic similarly. From the former ramparts, now a public promenade, the views are fine. Adjoining the Duomo (begun 1099) is the famous tower La Ghirlandina, 315 ft. high. The mediæval ducal palace contains a picture gallery with many works by the best Italian masters, a library, and a museum. The university, founded 1678, has about 550 students. The history of the town may be traced to 200 B.C. Cicero names it as one of the most splendid of the Roman cities.

It formed a part of the Cisalpine Republic, but, 1814, was restored to Francis IV, who, 1831, dishonored himself by his faithlessness in the terrible affair of *Ciro Menotti*. Francis V was driven out by his subjects, 1848; restored soon after by Austria, and obliged to fly a second time, 1859, soon after which Modena, by a popular vote, was annexed to the Kingdom of Italy. Pop. (1907) 64,843.

Modjeska (mōd-jēs'kā), *Helena*, 1844-1909; Polish-American actress; b. Cracow; married, at seventeen, G. S. Modrzejewska, whose name she later abbreviated; made her début, 1862, and played successfully in Cracow and several smaller towns; in Warsaw played the heroines in dramas of Shakespeare, Goethe, Schiller, and Molière, and in new Polish dramas. Her repertoire in her native tongue comprised 284 parts. In 1876 she came to the U. S., where, after studying English, she appeared in San Francisco, 1877, as *Adrienne Lecouvreur*. She afterwards made tours through the U. S. and England, and visited Poland professionally. After her retirement she lived on a ranch in California, where she died.

Mo'docs, tribe of N. American Indians, at one time a part of the Klamath Nation; habitat, the region of the Klamath lakes, on the California-Oregon border. In 1864 they joined the Klamaths in ceding their territory to the U. S., and removed to the Klamath Reservation, in Oregon. In 1870, under the leadership of "Captain Jack," the more turbulent part of the tribe went back to California, and attempts to return them to their reservation led to the Modoc War of 1872-73. The leader and five others were caught and hanged, and one part of the tribe was sent to Indian Territory and the other to the Klamath Reservation. Their combined strength, 1905, was less than 300.

Modulation, in music, the process by which, in any part of a composition, a transition is made from one key to another. Every piece of music, if regular, is written in some particular key, and to that key several others are so nearly related that short excursions may be made into them from the original key. From a *major* key we may thus proceed to the keys of its dominant, subdominant, relative minor, and the relative minors of the dominant and subdominant. And from a *minor* key we may pass to the keys of its dominant and subdominant, its relative major, and the relative major of its dominant and subdominant. A transition may be made also into any of these nearly related keys by the intervention of a single chord, *viz.*, that containing the leading note and dominant of the new key.

Mod'ule, in architecture, one half the lower diameter of the column used as a scale of dimension for all the various parts of a classic order. The Italian architects of the middle of the sixteenth century sought to establish an exact canon of proportion and form for every detail of the five classic orders, based on comparative measurements of antique Roman examples. The *module* was taken as the unit, and divided into "minutes" or "parts"; twelve in the Tuscan and Doric orders and eighteen in the

Ionic, Corinthian, and composite; or, according to Sir William Chambers, into thirty minutes for all the orders. The height, projection, and thickness of every part of each order were specified in minutes and modules.

Moe (mō'ē), Jorgen Engebretsen, 1813-82; Norwegian poet and folklorist; b. district of Ringerike; taught school and preached in different parts of Norway; became Bishop of Christiansand, 1875; published several volumes of verse, including "Collection of Songs, Ballads, etc., in the Norwegian Popular Dialects," and "To Hang on the Christmas Tree"; made journeys into the country to collect popular tales, and, with Peter Christian Asbjørnsen, published "Popular Tales from the Norse." These tales had a powerful influence on Norwegian language, literature, and art.

Möen (mō'ēn), island of Denmark, in the Baltic Sea; separated from Seeland by Ulfsund and from Falster by Grönsund; area, 84 sq. m. It is one of the most beautiful of the Danish islands, presenting a row of bold bluffs toward the Baltic. Pop. (1901) 15,780. Principal town, Stege.

Möris (mō'ris), artificial reservoir covering 63 sq. m., at the entrance (SE.) of the Fayum region, in Egypt, constructed by Amenemha III, of the twelfth dynasty. By the ancients the construction was attributed to a king to whom the name Möris was given. It was employed for the storage of water in time of high Nile, for purposes of irrigation.

Moesia (mō'shi-ä), province of the Roman Empire, corresponding to the present Bulgaria and Servia; bounded N. by the Danube, E. by the Black Sea, S. by the Hæmus (Balkan Mountains), and W. by the Save. Originally it was inhabited by tribes of Thracian race, but it was not made a Roman province until the time of Augustus. In 250 A.D. began the invasions of the Goths, and, 395, several Gothic tribes settled in the country and received the names of Mæso-Goths. The country remained a province of the E. Roman or Byzantine Empire until, in the seventh century, the Slavonians and Bulgarians entered it.

Moffat, Robert, 1795-1883; Scottish missionary; b. Ormiston; went to S. Africa as a missionary, 1816, and passed fifty-four years in successful labors among the Bechuanas and other barbarous tribes, into whose languages he translated portions of the Bible, hymn books, and other religious books. He published "Labors and Scenes in South Africa"; returned to England, 1870. The wife of the explorer Dr. Livingstone was a daughter of Mr. Moffat.

Moghileff (mō-gē-lēf'). See MOHILEV.

Mogul', corruption of the term Mongol, used in Hindustan to designate the Tartars who made themselves masters of Delhi, 1526, and placed their leader Baber, a descendant of Tamerlane, on the throne. His successors are known as the Mogul emperors, of whom the most eminent were AKBAB (1556-1605), JEHANGHEER (1605-27), and AURUNGZEBE (1658-1707). During these reigns the Mogul Empire

comprised nearly the whole of Hindustan. The authority of the Great Mogul, as the ruler was called in Europe, gradually dwindled, and, 1827, he became a titled pensioner of the British crown. The last of the Mogul dynasty, Mohammed Bahadoor, called King of Delhi, being implicated in the Sepoy mutiny, was deprived of his title and transported, 1858.

Mohacs (mō-häch'), town of Hungary, on the Danube; 37 m. ESE. of Fünfkirchen; center of a considerable trade in cattle, grain, wine, and other agricultural products, which are shipped hence to Vienna. Here, August 29, 1526, the young and chivalric king, Louis II, with an army of hardly 25,000 men, attacked a Turkish army of 200,000 men, under Solymán the Magnificent. After a protracted and desperate fight the Hungarian army was cut entirely to pieces, the king in his flight drowned in the Cælye, and a large portion of the country fell into the hands of the Turks. On August 12, 1687, the Austro-Hungarian army under Charles of Lorraine here completely defeated the Turks, and put an end to their dominion in Hungary. Pop. (1900) 15,832.

Mo'hair, name for the wool of the Angora goat and the fabrics woven from it. This kind of goods, formerly made only in the East and imported sparingly into Europe by way of Venice, is now extensively produced in Great Britain and other parts of Europe, and less extensively in the U. S. Mohair is combed like coarse wool or worsted and alpaca. It is mixed in many cases with cotton or silk.

Moham'med, or Mahom'et, 570-632; founder of Islam; prophet of the Mussulmans or Moslems; b. Mecca, Arabia; was of a poor family (Hashem), but his father, Abd-Allah, belonged to the Koreish, the most distinguished of the Arabian tribes, to whom the guardianship of the Kaaba was hereditarily intrusted. At the age of eight, his parents having died, he was adopted by an uncle, whom he served as shepherd and camel driver, winning the surname of El Emin ("the faithful"). Employed as business agent by the wealthy widow Khadijah, of Mecca, he so won her regard that, although fifteen years his senior, she became his wife, 585. She died, 619, leaving four daughters, the sons having died in infancy. Able now to devote more time to religion, Mohammed withdrew for long periods each year to Mount Hira, near Mecca, where he passed the time in meditation and prayer, and where, as Arab historians state, he saw in a dream the Angel Namous (Gabriel) and heard himself saluted as prophet of God. These ecstatic visions were repeated at intervals in his subsequent life, attended by bodily convulsions resembling epilepsy. In them Gabriel revealed to him the successive chapters of the Koran, which he committed to memory, as he could neither read nor write. These experiences he at first confided only to Khadijah, who became his immediate convert. During three years he preached in secret and made eight converts, his nephew Ali becoming the first male Mussulman. During nine years, 613-622, he preached publicly, making few converts, enduring all manner of insult and persecution.

In 620 he converted six men from Yatreb who had come in pilgrimage to Mecca. Two years afterwards Yatreb, accepted Islam and acknowledged Mohammed as the prophet of God. He now chose twelve apostles to propagate his religion. The Mussulmans of Mecca emigrated to Yatreb, leaving only Ali and Aboubekr with the prophet. Despite attempts at his assassination he succeeded a few months later in escaping to Yatreb, which at once changed its name to Medinet-el-Nabi, City of the Prophet. Medina was besieged, 627, but Mohammed was able to divide his enemies, some of whom became his adherents. He signed a truce, 628, for ten years with the Koreish, wherein it was stipulated that he might make the pilgrimage to Mecca the following year. As the Koreish violated the treaty, he marched on Mecca with 10,000 men. The Koreish surrendered without fighting. The conqueror destroyed the 360 idols surrounding the Kaaba, and Abou-Souphian and all the inhabitants declared themselves converts to Islam. Islam made such constant and rapid progress as to become practically the religion of Arabia; so when Mohammed again made the pilgrimage to Mecca, it was at the head of 100,000 Mussulmans, 632. His constitution had been undermined four years previously by poison given him by a Jewess. Soon after his return to Medina he sickened and died. He expired in the arms of Ayesha, his favorite wife. His only surviving child was Fatima, wife of Ali, the ancestress of all the sherifs or nobles of the Mussulman world.

Mohammed, name of four Ottoman sultans. MOHAMMED I, 1374-1421; son of Bajazet I; succeeded his brother Mousa, 1413. His main effort was to restore the almost ruined empire to its former condition. Though his reign was filled with wars against the learned dervish Behreddin, the impostor Mustapha, Karamania, Persia, and Venice, he loved peace, and was a sagacious, just, and generous sovereign; succeeded by his son, Amurath II. MOHAMMED II, surnamed THE GREAT, 1430-81; son of Amurath II; succeeded 1451. Illustrious as general, statesman, and legislator, no other sultan is equally revered by the Ottomans. He knew Arabic, Greek, Latin, and Persian; was a poet and writer, and was well versed in geography and mathematics. He favored the arts and sciences, built hospitals, mosques, and schools, and founded the great Ottoman code, or fundamental law, the Kanoun-Namé; yet he was treacherous, cruel, and revengeful. He conquered Servia, 1459; the Peloponnesus, 1460; the Empire of Trebizond and Wallachia, 1461; Karamania and Bosnia, 1463; Herzegovina, 1467; Negropont, 1470; the Crimea, 1476; Albania, 1479; and captured Otranto, 1480. His preëminent exploit was the overthrow of the Byzantine or Eastern Empire by the capture of Constantinople (May 29, 1453) after a fifty-three days' siege. That city he reorganized as capital of the Ottoman Empire, guaranteeing the Christians many rights and privileges, and attracting inhabitants from abroad. Succeeded by his son, Bajazet II. MOHAMMED III, 1566-1603; son of Amurath III; succeeded 1595. On his accession he had

his nineteen brothers bowstrung. An indolent and incapable prince, the empire rapidly declined during his reign. Insurrection followed insurrection, and the wars with Moldavia, Wallachia, the German Empire, and Persia were disastrous, despite the capture of Erlau and the Ottoman victory of Keresztes (October 26, 1596), where 50,000 Germans and Hungarians perished. Succeeded by his son, Achmet I. MOHAMMED IV, 1642-81; son of Ibrahim I; succeeded 1649. His reign, though signalized by two illustrious grand viziers of the Kupruli family, was disastrous. Its chief events were the completion of the conquest of Crete (1669), the terrible defeats of St. Gothard (1664), and Mohacs (1687), and the unsuccessful siege of Vienna (1683). The army, sharing the popular discontent, deposed him, 1687, and raised his brother, Solymán II, to the throne. Mohammed was confined in the seraglio till his death. MOHAMMED V (RECHAD MEH-MED), 1844- ; Sultan of Turkey; thirty-fifth sovereign of the house of Othman and twenty-ninth sultan since the conquest of Constantinople; was kept in seclusion during the thirty-three-year reign of his elder brother, Abdul Hamid, on whose dethronement by the Young Turks, April 27, 1909, he was proclaimed sultan; immediately took the oath of office administered by the Sheikh-ul-Islam, and, May 9th, formally assumed the sultanate by ceremonies at the Ayub Mosque and the Top Kapu palace; accepted honorary presidency of the Armenian Relief Committee; is believed to be of a mild and gentle disposition and to have acquired, during his imprisonment, some knowledge of modern life; has two wives and several children.

Mohammed, or Muham'mad, Shams ud-din. See HAFIZ.

Moham'medan Architecture. See ARABIAN ARCHITECTURE.

Moham'medanism, name commonly given in Christian countries to the religion established by Mohammed. The Mohammedans call their religion Islam, which means "full submission to God," and themselves Moslems, or Mussulmans. The Koran is recognized by all Mohammedan sects as their rule of faith and morals; but the great majority recognize, in addition, the Sunna, or traditions, embodying the expressions, occasional remarks, and acts of Mohammed, by which the interpretation of the Koran is in a great measure determined. The rationalistic Montasals and the extremists among the Shiites reject the Sunna altogether; the moderate Shiites acknowledge a tradition, but differ with the Sunnites respecting its extent. Among the Sunnites four orthodox schools were distinguished, all established between 740 and 840. They were called, after their founders, Haniftes, Malekites, Shafeites, and Hanbalites. Most Mussulmans are followers of the first named. The fundamental doctrine of Islamism is: "There is but one God, and Mohammed is his prophet." The Mohammedans believe that a great number of prophets have been divinely commissioned at various times, among whom six were sent to proclaim new laws and dispensations, viz., Adam, Noah, Abraham, Moses,

Jesus, and Mohammed. To the prophets were revealed certain scriptures inspired by God. All of these have perished except four, the Pentateuch, the Psalms, the Gospel, and the Koran. The first three, they maintain, have been falsified and mutilated, and the Koran supersedes them all.

Mohammed is the last prophet, and the Koran the final revelation. They believe in the existence of angels, four of whom are held by God in peculiar favor: Gabriel, by whom the Koran was revealed to Mohammed; Michael, the especial guardian of the Jews; Azrael, the "angel of death," who separates the souls of men from their bodies; and Israfil, who will sound the trumpet at the resurrection. After the judgment all must pass over the bridge Al-Sirat, which is finer than a hair, sharper than a sword, and beset on either side with thorns. The good will pass over easily and speedily; the wicked will fall headlong into hell. The delights of heaven are for the most part sensual, while the torments of hell consist chiefly in the extremes of heat and cold. All who believe in the unity of God will finally be released from punishment and enter paradise. Those who deny the absolute unity of God, idolaters, and hypocrites will suffer eternally. Mohammedans believe in the absolute predestination of all things by God. Their practical religion, which they call *din*, chiefly insists on four things: (1) Purification and prayer, which they regard as together making one rite; (2) almsgiving; (3) fasting; (4) the pilgrimage to Mecca. Prayer must be preceded by ablution; cleanliness is regarded as a religious duty. Prayers may be said in any clean place, but on Friday they must be said in the mosque, from the minaret of which the set period is announced by the muezzin five times a day.

At the end of the fast of Ramadan every Moslem is expected to give alms if he is able, for himself and each member of his family. During the whole of the month Ramadan, from the rising to the setting of the sun, Moslems neither eat nor drink nor indulge in any other physical gratification. All Moslems, men or women, should at least once during their lives, provided they are able, make the pilgrimage to Mecca. The duty may be performed by a substitute, in which case the whole merit redounds to the principal. Mohammed, while claiming for himself special privileges in regard to his domestic relations, asserting that they were allowed him by the direct permission of God, limited the number of wives which a true believer might take to four. Apart from the domestic relations, the ethics of the Mohammedan religion are of the highest order. Pride, calumny, revengefulness, avarice, prodigality, the drinking of any inebriating liquor, and adultery are condemned throughout the Koran; while trust in God and submission to his will, patience, modesty, forbearance, love of peace, sincerity, truthfulness, frugality, benevolence, liberality, are everywhere insisted upon.

Mohaves (mō-hā'vās), members of a tribe of N. American Indians; the most populous and warlike of the Yuman family; since known

to history, living on both sides of the Colorado River in Arizona; numbering (1905) 1,589, and located at the Colorado River, Fort Mohave, San Carlos, and Camp McDowell agencies. They formerly painted themselves from head to foot with ocher, clay, and charcoal; though a river tribe, made no canoes; hunted little, living chiefly on fish and products of the soil; and cremated their dead.

Mohawk (mō'hāk) River, principal affluent of the Hudson, surpassing in volume that stream above its confluence; rises in Lewis Co., N. Y., and after a generally E. course reaches the Hudson at Cohoes; is about 160 m. long; it flows through a valley famed for its beauty.

Mo'hawks, one of the Five Nations of N. American Indians, in the Iroquois confederation; formerly living in villages in the Mohawk Valley, N. Y., between Schenectady and Utica; took the side of the British in the Revolutionary War, under the famous chief, Brant, and ravaged the American settlements. After the war the larger portion, under Brant and Johnson, removed to Canada, where the remnant still live on lands granted by the British Govt.

Mohe'gans, or **Mohi'cans**, members of a tribe of N. American Indians, belonging to the Algonquin family; originally located on the Thames River, Conn.; subsequently scattered through Connecticut, Massachusetts, and Rhode Island, and at one time holding both sides of the Hudson River for about 75 m. They received the Dutch amicably; were driven by the Mohawks to the Connecticut, 1628; afterwards made peace with the Mohawks, and joined the English in their struggle against the French; sided with the Americans in the Revolutionary War. In 1904 they were reduced to about 100 individuals of mixed blood, at Norwich, Conn., only one of whom, an old woman, retained the language.

Mohilev (mō-hē'lēv), or **Moghileff**, capital of government of Moghile, Russia; on the Dnieper. It has good educational institutions, several manufactures, and a large export trade in grain, hides, leather, wax, and honey through the ports of the Baltic and those of the Black Sea. Pop. (1900) 47,591.

Mohl (mōl), **Hugo von**, 1805-72; German botanist; b. Stuttgart; was appointed Prof. in Botany and director of the Botanical Garden in Tübingen; was the most eminent vegetable anatomist of his day, and published numerous works.

Mohl, **Jules von**, 1800-76; German-French Orientalist; b. Stuttgart, Germany; brother of the preceding; was appointed, 1826, Prof. of Oriental Languages at Tübingen, with permission to remain in Paris, where he had been prosecuting his studies; became, 1847, Prof. of Persian at the Collège de France, and, 1852, director of the Oriental department of the national printing office. His principal work is his edition of Firdaus's "Shah Namah."

Moir, **David Macbeth**, 1798-1851; Scottish physician and author; b. Musselburgh; became

widely known as "Delta," from the letter Δ appended to his numerous poems in the periodical literature of that time. His "Legend of Genevieve," "Autobiography of Mansie Wauch," a novel, "History of Medicine," "Domestic Verses," and his lectures on "Poetical Literature" are all of value.

Mojave (mō-hā'vā) In'dians. See **MOHAVES**.

Molasse (mō-lās'), peculiar, mostly gray sandstone, found abundantly throughout a large portion of the Alpine system. It is of a fine granular texture, and is highly prized as a building stone.

Molasses, sirup which remains in the manufacture of brown sugar, after separating from the juice all the saccharine matter that can be made to crystallize to advantage; also the thickened juice of sorghum and sap of the maple. "Sugar-house" molasses is the sirup which remains in the conversion of brown into refined sugar. By fermentation and distillation molasses, mixed with the skimmings of the sugar boiling, is made to produce rum.

Molay (mō-lā'), Jacques Bernard de, abt. 1244-1314; last grand master of the Order of Knights Templars; b. Burgundy; became grand master, 1298; won renown by his invasion of Syria, 1289, and his temporary conquest of Jerusalem; was defeated, 1302, and forced to take refuge in Cyprus; was ordered to return to France by the pope at the instigation of Philip IV, who coveted the wealth of the order and was jealous of its power; was arrested, tortured, and forced to confess the guilt of the Templars; afterwards recanted his confession, and was burned at the stake in Paris.

Molbeck (mōl'bēch), Christian Knud Fredrik, 1821-88; Danish poet; b. Copenhagen; son of Christian Molbeck, Prof. of Literature at the University; was Prof. of Scandinavian Languages and Literatures at the Univ. of Kiel, 1853-64; censor of the Royal Theater and dramatic and literary critic, 1864-81; works include "Ambrosius," a drama; "Pictures from the Life of Jesus," poems; "The Cliff-King's Bride," drama; and "Lyrical Poems and Romances."

Moldau (mōl'dow), river of Bohemia; rises in the Böhmerwald Mountains at an elevation of 3,750 ft., flows first in a SE., then in a N. direction, becomes navigable at Budweis, and joins the Elbe opposite Melnik after a course of 276 m.

Moldavia. See **RUMANIA**.

Mold'ing and Cast'ing, process of forming a cavity in a suitable material conformably to a pattern, and of shaping molten metal or other liquid by pouring it into such cavity, called a mold. The art of molding has come down to us from a very remote period; we find evidences of its practice by the most ancient nations, in articles found among the ruins of temples, palaces, fortresses, and cities. We in our day can show nothing superior, either in design or execution, to the work of men whose

names and methods are lost. The metal chiefly used by the ancients was bronze, and their alloy contained about the same proportion of tin and copper as that now used. Bronze castings have been found in Egypt which are thought to be more than four thousand years old, and the Israelites brought their knowledge of the art from that country.

The process of casting varies with the kind of article to be produced and the material of which it is made. In casting a statue or a bust of plaster of Paris, where perfection of exterior form is alone sought, it is only necessary to pour an indefinite quantity of the fluid mixture of plaster and water into a hollow mold, and take an impression of its internal surface. In casting a medallion or cameo it suffices to pour the liquid material over a one-sided, open mold, to such a depth as may be required; but in the casting of statues in bronze, or in the casting of bells, of stoves, of cylinders, and of pieces of machinery, and all other articles that are required to have a definite thickness and weight, it is necessary that the molds shall have two or more walls. Casting or founding may be divided into: (1) Preparing a mold of the figure to be cast, which process usually includes the making of a pattern of such figure; (2) the melting and reducing to the proper degree of fluidity of the metal; and (3) the introduction of the molten metal into the cavity of the mold, and whatever manipulation may be necessary during the solidification and cooling. The mold may be of metal, of stone, of plaster of Paris, of clay, of loam, or of sand.

A metal mold may be formed either by excavating it with tools worked in a lathe or by the hand, or it may be cast in a similar manner to the article of which it is to form the mold. Small articles of the more fusible metals, and of simple form, are usually cast in metal molds which are composed of two or more parts held together by hinges or pins, and by machines many such articles are cast at one operation. The patterns used are in form exact representations of the articles to be cast in the molds made from them, but in size they usually exceed the finished article by an amount represented by the "shrinkage" of the metal in passing from a liquid to a cold, solid condition. Patterns are usually made of wood. Pine is the kind more generally used, but cherry and mahogany are often employed for small objects. Wood patterns are coated with shellac varnish, to prevent the absorption of moisture from the damp materials of the mold; but when a pattern is to be used often, it is preferable to make it of metal. Brass and cast iron are used for this purpose. Patterns are frequently made in two or more parts to facilitate molding, and for the casting of gear wheels it is a growing practice to make a small segment of the rim for a pattern of that part; this is attached to a very exact apparatus for placing it, which enables the molder to make it subserve the purpose of a complete pattern of the rim. Models for statuary are commonly built up by the artist in clay, from which a plaster cast is made, and from this the mold.

Three kinds of molding are practiced, viz., green sand, dry sand, and loam molding. In the first there is employed a "molding sand" composed chiefly of silica with a small admixture of alumina, which is always used in a moist or "green" condition, in wooden boxes or flasks. In the second method the molding sand is used in iron flasks, and before the mold is considered finished it is thoroughly dried, hence the term "dry-sand molding." In loam molding the sand employed has more alumina associated with it, and usually has mixed with it a quantity of horse dung to increase its adhesiveness and porosity; this molding composition is called "loam." In loam molding patterns are rarely employed save for certain ornamental parts and for projecting "ears" or "lugs," the most of the work being done with sweeps, straight edges, and other tools. The flasks or boxes used for holding the sand of the mold are usually rectangular frames of wood or metal, without top or bottom, having in their interior a number of cross bars or traverses, to assist in sustaining the sand. Flasks are commonly made in two parts, the upper of which is called "the cope" and the lower "the drag." The cope is prevented from lateral displacement by dowel pins on its lower side, which enter corresponding holes in the top of the drag. Wood is generally used for flasks that are employed for green-sand molding, and iron flasks are always used for dry-sand work. Sometimes iron flasks are also used for small work that is molded in green sand.

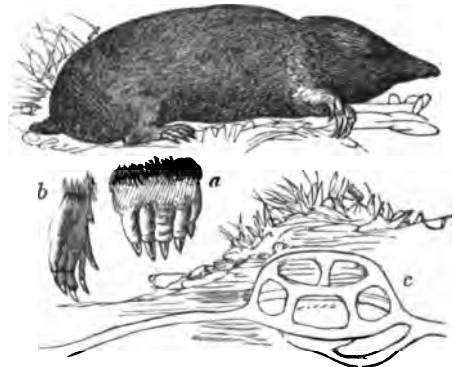
"Snap flasks" are a special variety only used for very small work; in these there are no traverses, and both the cope and drag are hinged at one corner, and have a latch at the opposite angle; this arrangement permits the detachment and removal of the flask from the mold after it is finished, and thus it can be used for any number of molds. In iron founding the metal is generally melted in a furnace of the form called cupola, and coke, charcoal, and in the U. S. anthracite, are employed in melting the iron; in brass and bronze founding the melting is usually done in a reverberatory furnace with charcoal, but cupolas and crucibles are also used. A statue in bronze is cast in several sections to avoid cracking and straining of parts on cooling and contraction of the metal, and the sections are afterwards readily joined.

Mold'ings, ornaments in architecture and decoration, consisting of narrow raisings or lowerings of the surface. The new surface, that is, the surface of the molding, may be plane, or of a simple or elaborate curvature. A molding has generally the same profile or section from one end to the other; it is supposed to be produced by moving the profile at right angles to its plane, either in a right line or along a curved path; moldings in plaster and other plastic material are made in this way. In many architectural styles moldings constitute one of the most important elements in design, serving by their multiplied alternations of light, shade, and shadow in parallel lines to frame and accentuate the main divisions of a composition, and to impart anima-

tion and variety to its whole aspect. They occur most frequently grouped in string courses separating the successive stages of the design; in the bases and capitals of columns, and in entablatures and cornices, to support and to crown its various features; in arch moldings, to break up the depth of heavy arches into pleasing successions of convex and hollow surfaces, whose concentric lights and shades repeat the form of the arch, and mediate between the bright wall and the deep shadow of the arch; and in frames, to decorate the outlines of decorative or constructive panels. The essential consideration in designing moldings is the profile; for although this is not seen, and although a pretty profile may not give an effective molding, yet on this depends the whole character of the molding and of its effect in the composition. In the art of profiling moldings the ancient Greeks were absolute masters, and the combination of delicacy and strength in the subtle and elusive curves of Greek moldings has never been equaled.

Molé (mō-lā'), Louis Mathieu, 1781-1855; French statesman; b. Paris; published, 1806, his "Essais de Morale et Politique," which attracted the attention of Napoleon by their defense of monarchical principles; held different offices in the civil service during the empire; was made a count and peer of France, and was confirmed in the possession of these dignities by the Bourbons; became Minister of Marine, 1815, of Foreign Affairs, 1830, was Prime Minister, 1836-39.

Mole (mōl), name given to the various small insectivorous mammals forming the subfamily *Talpinae*, distinguished by their adaptation to an underground life. The eyes are minute, the body cylindrical, the neck short, the feet broad,



EUROPEAN MOLE.

a, Front paw; b, Hind paw; c, Nest.

powerful, and more or less turned on edge. The fur is soft, thick, and silky in texture. The mole of the E. U. S., *Scalops aquaticus*, excavates long subterranean passages, the earth being thrown up at intervals, forming the well-known mole hills.

Mo'lech. See MOLOCH.

Mole Crick'et, burrowing crickets, and primarily those of the genus *Gryllotalpa*. In the



MOLE CRICKET.

U. S. they are most common in the South. They are more commonly found in wet ground, and some species are very destructive to crops.

Mol'ecules, according to the assumed theory of matter, the smallest particles of any definite substance that can exist in the free state. For example, water, the chemical compound, consists of the elements hydrogen and oxygen, which are combined chemically with each other. Now, the mass of water is believed to consist of extremely minute particles, each of which has the same composition as water. These particles are the molecules of water. If the molecule is decomposed, the constituents of the molecules are obtained, and these are hydrogen and oxygen. When water is converted into vapor these molecules are separated from one another, and move freely through the mass, the average velocity of the motion increasing with increasing temperature. See ATOM.

Moleschott (mô'lê-shôt), Jacob, 1822-93; German physiologist; b. Bois-le-Duc, Holland; practiced medicine at Utrecht, and lectured at Heidelberg on physiological chemistry and anthropology, 1847-54, when he was obliged to withdraw on account of his materialistic views. In 1856 he became professor at Zurich, and, 1861, at Turin. Though not denying the existence of a spiritual life, he connected the origin of all species of animals with physical laws alone. He was a high authority in physiology and anthropology.

Molesworth, Mary Louisa (STEWART), British author; b. Holland; married, 1861, Major R. Molesworth; popular writer of works for young people, which include "Carrots," "Cuckoo Clock," "Lives of the Saints for Children," "The House that Grew," and author of a number of novels, the early ones having been published under the name ENNIS GRAMHAM.

Molesworth, Sir William, 1810-55; British statesman; b. London; succeeded to the baronetcy, 1823; was elected to Parliament, 1832; was an intimate friend of Bentham and James Mill, of whose opinions he was a leading exponent in Parliament; founded *The London Review*, 1835, which he merged in *The Westminster Review*, 1836, and published at great expense a magnificent edition of the "Works of Thomas Hobbes." He was the first to call public attention to the horrors of the convict system then in vogue, and to the maladministration of the Colonial Office, and was largely instrumental in effecting a radical change in

both these branches of the administration. In 1853 he became first Commissioner of Public Works in the Cabinet of the Earl of Aberdeen, and, 1855, Secretary of State for the Colonies in Lord Palmerston's first cabinet.

Molière (mô-lyâr'), real name JEAN BAPTISTE POQUELIN, 1622-73; greatest dramatist of France; b. Paris; son of Jean Poquelin, a tradesman, and also *valet-de-chambre*, which office he obtained for his son; was educated at the College of Clermont, and was sent to the law school at Orleans, but left the latter to become a member of a troupe of players, at which time he assumed the name of Molière. After failing of success in Paris, the "Illustre Théâtre," as the troupe styled itself, returned to the capital fifteen years afterwards. By the pieces "The Madcap" ("L'Etourdi") and "The Loving Spite" ("Le dépit amoureux"), adapted from foreign sources by Molière, now stage manager, the protection of the king's brother was won and a permanent home for the "Troupe de Monsieur," as it renamed itself, obtained. In 1665 Louis XIV bestowed a pension on the company, which was thenceforth known as the "Troupe de Roi." Molière's first great success was obtained, 1659, by the production of his "Affected Ladies" ("Les précieuses ridicules"). His progress as an author was hampered by the necessity of preparing semioperatic comedies for the king's great fêtes, and not until 1662 did he give, in his "School for Wives" ("L'École des femmes"), an example of the mature development of his ideas. In the ten years that intervened before his death he produced the series of great comedies in prose and verse that remain the glory of the French stage. This includes "The School for Husbands" ("L'École des maris"), "The Hypocrite" ("Le tartuffe"), "The Misanthrope," "A Physician in Spite of Himself" ("Le médecin malgré lui"), "Amphitryon," "Don Juan," "Love as Physician" ("L'Amour médecin"), "The Bourgeois Gentleman," comedy ballet; "The Learned (or Pedantic) Ladies" ("Les femmes savantes"), "The Imaginary Invalid" ("Le malade imaginaire").

Molina (mô-lê'nâ), Luis, 1535-1601; Spanish theologian; b. at Cuenca, in New Castile; entered the order of the Jesuits in 1553; was Prof. of Theology at the Univ. of Evora, Portugal, for twenty years. In 1588 he published his "Liberi Arbitrii cum Gratiae Donis, Divinae Præscientia, Providentia, Prædestinatione et Reprobatione Concordia," which, under the form of a commentary on some parts of Thomas Aquinas's "Summa Theologiae," attempted to explain, on a new basis, the harmony between grace and free will. The Dominicans, of whom Aquinas is the chief glory, attacked the book and the Jesuits defended it. A heated controversy ensued, the matter was referred to Rome, and Clement VIII, in 1597, appointed a commission to examine it. The deliberations of this body lasted nine years, the result being that the contestants were forbidden to denounce either Thomism or Molinism as heretical.

Moline (mô-lên'), city in Rock Island Co., Ill.; on the Mississippi River; opposite Rock

Island. The three cities of Moline, Rock Island, and Davenport are connected by steam and street railways, ferries, and bridges, and all derive water power for manufacturing from the river. The city is in a rich coal region, and there are a number of productive mines in its vicinity. The industries include the manufacture of agricultural implements, malleable iron, steam engines, carriages, buggies and wagons, paper, lumber, cabinet and pipe organs, lead roofing, wind-mills, milling machines, and furniture. Pop. (1910) 24,199.

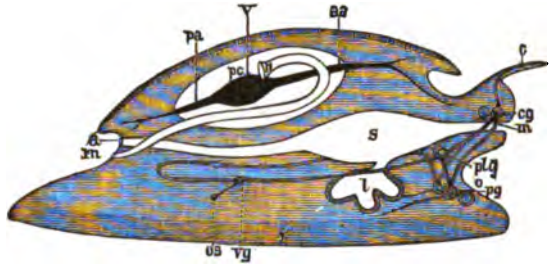
Molino del Rey (mō-lē'nō dēl rā'), Spanish, "king's mill," massive series of buildings $\frac{1}{2}$ m. N. of the castle of Chapultepec, near the City of Mexico. They were originally used as a flour mill, afterwards as a foundry of arms, and were occupied as a fortress by a portion of the Mexican army during the war between the U. S. and Mexico. On September 8, 1847, the buildings were attacked and carried by storm by a division of the U. S. army. Each side had about 4,000 men, and the loss on both sides was heavy.

Molinos (mō-lē'nōs), Miguel, 1627-96; Spanish mystic; b. near Saragossa; settled, after being ordained priest, in Rome, where a great number of people chose him for their confessor. In 1675 he published his "Guida Spirituale," which attracted great attention and was translated into different languages. It teaches that true godliness consists in uninterrupted communion with God, established by contemplation, and was the foundation of the so-called Quietism which afterwards found its most striking development in Mme. Guyon. The Jesuits, however, found that this view endangered the doctrine of good actions. Pope Innocent XI condemned the book, 1687; Molinos recanted, but was imprisoned for the rest of his life in a monastery at Rome. When his papers were seized 20,000 letters were found from persons desiring his counsel in spiritual matters.

Mollusca, branch or division of the invertebrate animal kingdom, so named from the soft character of the tissues, a point of no importance. That branch of zoölogy which treats of molluscs is sometimes termed malacology and sometimes conchology, but both terms are passing into disuse. The mollusca include such animals as have one or more nervous ganglia below the entrance to the alimentary canal, from which radiate cords which form a collar round the oesophagus and supply the other organs of the body; in the higher forms other ganglia are added above the oesophagus and unsymmetrically in different parts of the body. The body is covered by a soft, moist skin, in or on which a shell is usually secreted; many have no head distinct from the rest of the body; the organs of sense are comparatively slightly developed, and the movements slow. Respiration is effected usually by gills; a heart is generally present, receiving the blood from the gills, and distributing it by arterial tubes; the capillaries are wanting, and the veins are replaced by sinuses; the blood is commonly whitish or whit-

ish blue. Some molluscs are hermaphrodite and require mutual impregnation, and in others the sexes are distinct; most are oviparous.

The shells of molluscs may be univalve, consisting of one piece, as in snails, or bivalves, as in clams and oysters, and may vary in size,



DIAGRAMMATIC LONGITUDINAL SECTION OF A MOLLUSC.

a, vent; aa, anterior artery; c, tentacle; cg, brain; f, foot; l, liver; m, mouth; pg, pedal ganglion; plg, plural ganglion; n, nephridium; o, ear; pa, posterior artery; pc, pericardium; os, organ of smell; rn, right nephridal opening; s, stomach; v, ventricle of heart; vg, visceral ganglion.

from a rice grain to those of the giant clam, which sometimes weighs 500 lb. Molluscs are divided into three classes: *Lamellibranchs*, including the clams; *Gastropods*, or snails; and *Cephalopods*, or cuttlefish, squids, etc. The terrestrial species are few compared with those of fresh, and especially of salt, water. Molluscs supply an abundant, wholesome, and usually easily digestible article of food to nations civilized and savage, as well as to animals; bivalves, such as the oyster, are considered the best, as having the least muscular fiber. The ornamental purposes to which the pearl and cameo shells are put are well known; from the cuttlefish are obtained sepia and India ink; from the *Purpura* and *Baculum* of the Mediterranean came the famous Tyrian dye of antiquity; from the filaments of the byssus of *Pinna* are made tissues much esteemed on the shores of the Mediterranean. On the other hand, molluscs are sometimes injurious to man; slugs and snails do mischief in gardens; the *teredo* pierces ship timber, and the *pholas* bores into and weakens stone dikes. The number of species of molluscs probably exceeds 25,000, surpassed only by the number of articulate.

Mol'ty Maguires (mā-gwīrz'), secret criminal order organized abt. 1854 among the anthracite miners of Irish descent in NE. Pennsylvania. It was a branch of the Physical Force party of Ireland, and was alleged to have dominated the Ancient Order of Hibernians. A series of murders, including that of a colliery superintendent, in 1865, brought the organization into notoriety, and for years it maintained a reign of terror in certain districts. Finally, as the result of the efforts of Franklin B. Gowan, a mine owner, and the skillful work of James McParlan, a Pinkerton detective, who joined the order for three years (1873-76), collected evidence against it, many of its leaders were executed or sentenced to long terms of imprisonment, and after 1877 the order was little heard of.

Mo'loch, or **Molech**, called also **MILCOM** (I Kings xi, 5) and **Malcham** (Zeph. i, 5),

fire god of the Phœnicians (a modification or hypostasis of Baal, the sun god), but spoken of in Scripture as more especially "the abomination of the Ammonites." That children were sacrificed to this deity is not to be questioned, although "passing through the fire to Molech" may not always mean so much. Solomon and other later kings of Judah are mentioned as worshipping it, but the captivity seems to have effectually extirpated his cultus.

Molokai (mō-lō-kī'), middle island of the Hawaiian group, and one of the smallest; is 35 m. long by 6 broad, contains about 175 sq. m., and is thinly populated. It is flat in the center, but elevated at the ends; the W. part is arid, the E. wooded. There is a colony of lepers on the island, and on the island Oahu, to the W., is an asylum for the children of these lepers.

Moltke (mōlt'kè), Helmuth Carl Bernhard von, 1800-91; Prussian military officer; b. Parchim, Mecklenburg; entered the Prussian service, 1822, and was appointed a member of the staff, 1832; published, 1835, a work on the Turko-Russian War of 1828-29, and visited Turkey that year; at the request of the Sultan, aided in the reorganization of the Turkish army and in the improvement of the fortifications of Silistria, the Dardanelles, etc.; published, 1841, "Letters on the Situation in Turkey in the Years 1835-39." In 1847 he was attached to the Governor General on the Rhine; 1848, became chief of a division of the staff; was chief of the staff of the Fourth Army Corps, 1849-55; adjutant to Prince Friedrich Wilhelm, 1856; chief of the staff of the whole army, 1858. In 1864, in the war with Denmark, he led the army for the first time in battle, having drawn up beforehand the plan of the campaign. The campaign which resulted in the victory over the Austrian army at Königgrätz, or Sadowa, 1866, was also planned by him, and he had absolute authority as commander in chief. To the rank of general of infantry the king added the order of the Black Eagle, the Diet voted him a dotation, and, 1867, he was elected a Deputy to the N. German Diet. Immediately after the Austrian War Moltke planned a campaign against France, anticipating attack from that quarter. The larger share in the success of the campaign of 1870-71 is his due; he directed in person the operations of the armies, the king having only nominal command.

On the day of the capitulation of Metz the king made him a count; on the conclusion of the armistice he gave him one of the five grand crosses of the Iron Cross, and on the day of the return of the troops to Berlin he made him a field marshal. He also received a dotation of 300,000 thalers, and the freedom of many cities was presented to him. He was not very talkative, and as he was thoroughly conversant with several languages, people said of him, epigrammatically, that "he was silent in seven languages." Among the works which he partly wrote, partly edited, are "The Italian Campaign of 1859," "The German Army," and "The Franco-German War."

Moluccas, or **Spice Islands**, a large group of islands of the Malay Archipelago, lying be-

tween Celebes and New Guinea; total area, 43,864 sq. m. They are all of volcanic origin, high, mountainous, and exceedingly fertile. The forests, which cover the mountains, contain teak, ebony, sandal, iron, and satin wood, besides palms, breadfruit trees, and many varieties of the finest fruit trees. Rice, sage, cotton, indigo, coffee, and sugar are grown; the nutmeg is grown on the Banda Islands and the clove in Amboyna. The N. division of the archipelago, comprising several islands and forming the residency of Ternate, is only indirectly under Dutch government, while the S. division, comprising Amboyna, the Banda Islands, and the Uliassers, and forming the two residencies of Amboyna and Banda, is governed directly as a province of the motherland. The Dutch have possessed these islands since the beginning of the seventeenth century. Pop. (1900), 430,850.

Mo'ly, a fabulous herb, a sovereign remedy for all diseases, which Mercury gave Ulysses as a counter-charm against Circe. The ancients identified it with a species of garlic.

Molybde'num, symbol Mo., metal first isolated in 1782, occurring in a number of minerals, especially its sulphide molybdenite (MoS_2), which in some respects resemble galena. Molybdenum is a silvery-white metal, hard and somewhat malleable. It is not affected by air or moisture at ordinary temperature. Its compounds are of scientific interest only, though ammonium molybdate is used in a chemical test for phosphoric acid.

Mombasa (mōm-bās'ā), capital of the British E. Africa Protectorate; on an island near the coast, with one of the best harbors in that vicinity. Founded by the Arabs after they began their occupation of the E. coast in the eighth century, seized by the Portuguese in the sixteenth century, and from early in the seventeenth century the possession of the rulers of Muscat and Zanzibar, it was ceded, 1891, to the Imperial British East Africa Company, and, 1895, was taken over by the British Govt. The city is visited by the steamers of four lines; is the starting point of many caravans to the interior; and is the coast terminus of the railway to Victoria, 584 m. Pop. (1900) abt. 27,000.

Mo'ment, term used in mechanics, with several significations. The moment of a force with regard to an axis is the product of the force by a certain function of its position with regard to the axis; it is the measure of the tendency of that force to cause rotation about the axis. If the axis and force are at right angles, the moment is simply the product of the force by its distance from the axis, and in that case the moment of the force may be said to be taken with regard to the point in which the perpendicular plane through the force meets the axis. If there be several forces acting in the same plane, the sum of their moments, with regard to an axis perpendicular to the plane, or a point in the plane, taken positively or negatively, according to the direction in which they cause rotation, is called the resultant moment. If this resultant moment be zero for all points in the plane the forces are

in equilibrium, and conversely, if several forces in the same plane are in equilibrium the algebraic sum of their moments with regard to any point much vanish. If the forces be expressed in pounds and the distances in feet the moments are expressed in the compound unit called a pound-foot.

The *bending moment* at any section of a beam is the algebraic sum of the moments of all the forces on either side of that section. The *statical moment* of a plane surface is the sum of the products obtained by multiplying each element of the surface by its distance from an axis in that plane. The *moment of inertia* of a plane surface is the sum of the products obtained by multiplying each element of the surface by the square of its distance from an axis in the same plane.

Momiers (mō-mī-ä'), French, "mummers" or "maskers," cant name given, 1818, to a body of evangelical Protestants of Switzerland and the adjoining parts of France and Germany, whose distinguishing characteristic was the fervency of their religious exercises. The Momiers accused the National Church of Switzerland of apostasy from Calvinism, especially in denying the divinity of Christ. They were consequently subjected to repressive measures, and ultimately returned to the orthodox communion. The most distinguished of the Momiers was Rev. Caesar Malan.

Momm'sen, Theodor, 1817-1903; German historian; b. Garding, Schleswig; was Prof. of Roman Law at Leipzig, 1848-50, then was dismissed for political reasons; held the same chair at Zurich, 1852-54, and at Breslau, 1854-58; Prof. of Ancient History at Berlin after 1858; secretary of the Berlin Academy after 1873, and edited its monumental "Corpus inscriptionum latinarum." Author of "Roman History," "Roman Chronology Down to Caesar," "History of Roman Coinage," "Collection of Neapolitan Inscriptions," "Roman Investigations," etc. His brother **TRYCHO**, 1819-1900, taught in gymnasia in Eisenach, Oldenburg, and Frankfurt; edited "Pindar," made a translation of that poet's works, and wrote "Paserga Pindarica." **AUGUST**, another brother, taught school in various German cities, and became an authority on Greek and Roman chronology.

Mompox, or **Mompox** (mōm-pōh'), town of Bolivar, Colombia; on a swampy island, formed by the Magdalena River, which here divides into several channels; was founded by Heredia, 1539; was long the chief river port of this region, and was the scene of important combats during the war for independence. Pop. (1908), 11,966.

Mo'mus, in Greek mythology, son of Night, according to Hesiod, and the personification of mockery and censure. Aphrodite was the only being whom he found blameless, a fact which angered him so much that he burst.

Mon'achism, life of religious retirement from the world, whether in solitude (the anchoritic or eremitic life) or in company with others (the cenobitic life). In India it was practiced as early as the fifth or sixth century

B.C., and though the monastic life was open to the three upper castes, it was almost confined to the Brahmans. Gautama, the founder of Buddhism, built a monastic order out of the individualistic monasticism of Brahmanism, promoting the cenobitic life, and throwing it open to all. Outside of India monachism seems never to have been widely prevalent in ancient Asia, except where Buddhism made its influence felt, though there are traces of ascetic tendencies of a mild character and of a predilection for a life of retirement in the teachings of Confucius and Mencius, the Chinese sages, and the monastic life apparently found a limited acceptance at an early day in Persia. Among the Greeks the ascetic and monastic tendency appeared in the Pythagoreans and in the Orphic brotherhood, and also in the Cynics. In Egypt monachism found a home and enjoyed a striking development in the Alexandrian period in connection with the worship of Serapis.

A type of monachism may be found in the asceticism practiced by the Jewish Essenes and Therapeutæ at the dawn of Christianity. A severer form was the life led by Christian anchorites or hermits. Even before the end of the first century the ethical emphasis in Christian circles was transferred from active love for God and man, upon which Christ had laid chief stress, to abstinence from sin, especially from sin of a fleshly character. That asceticism should follow was inevitable. Another influence must also be recognized as contributing to the same general result. This was the growth of the conception of Christianity as a law which led naturally to the practice of penance, a practice which had begun to find a place within the Christian Church even before the middle of the second century. The number of hermits increased very much during the third century, filling the mountain wildernesses of Asia Minor, Syria, and Egypt. The monastic institutions of Egypt were imitated in Syria and Asia Minor, and on the S. shores of the Black Sea, eremitical life being in the fourth, fifth, and sixth centuries everywhere superseded by the cenobitical. From the desert monastic institutions were transplanted to the towns. Traditionally all the Eastern monks have followed up to the present day the so-called rule of St. Basil, and have called themselves after either St. Basil or St. Anthony. They are still numerous in all the Eastern churches.

Monachism was destined to achieve its greatest successes in the West. St. Martin of Tours, influenced by Athanasius, is said to have founded the first monasteries W. of the Alps, and may thus be called the father of monachism in Gaul. Ambrose founded a monastic establishment at Milan, and there he converted Augustine, who in his turn became in N. Africa the originator of a form of monastic life that was to live afterwards in thousands of European institutions. The Augustinian manner of living was taken to England by Pelagius, and to Ireland by St. Patrick. St. Columba sent monastic colonies into Scotland, the Hebrides, and the Orkneys. St. Columbanus founded numerous similar institu-

tions in Gaul, Switzerland, Germany, and N. Italy. England had flourishing cenobitic establishments in the same period. Benedict, 529, built at Monte Casino two oratories, and his rule spread rapidly over all W. Europe, uniting independent establishments of both sexes in one great monastic hierarchy. Even the warlike tendencies of the Middle Ages sought a union with the monastic spirit by the establishment of several orders of knights. The large increase of the number of orders called forth much opposition, and the Lateran Council, 1215, decreed that no new order should be established. Yet the same period witnessed the birth of a new class of orders, the mendicants—Franciscans, Dominicans, Carmelites, Augustinians, and several others. The Franciscans and Dominicans soon took the lead.

The Reformation of the sixteenth century constitutes another turning point in the history of monachism. The Council of Trent pronounced the usefulness of monastic establishments, and regulated their possessions, internal administration, and the election of superiors, and extended the rights of the bishops with regard to the inspection and superintendence of the convents. New orders also arose in the Church from the very need of reform, and bore the impress of the times. The best known of these organizations are the Theatines, Barnabites, Jesuits, and Oratorians of St. Philip Neri. The French Oratorians, the Lazarists, Sulpicians, Redemptorists, Passionists, the female organizations of Ursulines, Visitation Nuns, and Sisters of Charity, and other congregations are of later date. Vincent de Paul founded a society of regular clerks, who, under the name of Lazarists or Priests of the Mission, have wielded a great influence in France and elsewhere; and M. Olier gave a similar organization to the Sulpicians. Of all these new orders the Society of Jesus has had the most celebrity.

Since the Reformation monasticism has continued to spread within the Roman Catholic Church, and new religious congregations, male and female, have been founded. The religious orders for women particularly have come to occupy a prominent place in charitable and educational work. In the U. S. liberty has proved the fostering mother of modern monasticism. Several orders have found a home here, and, devoted mainly to missionary and philanthropic work, they constitute an important agency in promoting the growth of the Roman Catholic Church. In the Church of England and the Protestant Episcopal Church in the U. S. sisterhoods and even brotherhoods have been formed at various times, under the auspices of what is known as the High Church party.

Monaco (mōn'ā-kō), smallest independent principality of Europe; on the Mediterranean, nearly surrounded by the French department of Alpes-Maritimes; 9 m. E. of the city of Nice; area, 8 sq. m. Up to 1861 it had an area of 72 sq. m., and included Mentone and Roccabruna; now consists of Monaco, the capital, Condamine, and Monte Carlo. A constitution promulgated 1911 established a National Council elected by universal suffrage.

The administration is carried out by a ministry and a Council of State. There is a court of first instance and a justice of the peace. Two judges from Paris, appointed by the prince, act as a court of appeal when necessary. The principality has its own coinage, which is current in all the states of the Latin union, and its own postage stamps. The revenue is derived from the gaming tables and from the exportation of olive oil, oranges, citrons, and perfumes. The capital is on a rocky promontory, surrounded by ramparts. It is the see of a bishop, and contains among its public buildings a palace, a cathedral, and a museum. Condamine has manufactures of liqueurs and perfumes. At Monte Carlo is the Casino, a group of handsome buildings in a beautiful park, besides hotels and villas for the accommodation of visitors (abt. 400,000 annually) to the gambling rooms in the Casino. For 500 years Monaco belonged to the Grimaldis, a Genoese family. It was annexed to France, 1793; was restored to the Grimaldis by the Treaty of Paris, 1814; was placed under the protection of Sardinia by the Treaty of Vienna, 1815; and, 1860, came under the protection of France, which, 1861, bought from the Prince of Monaco, Mentone, and Roccabruna. Pop. abt. 13,600.

Mon'ad, in philosophy, a word used by the Neoplatonists of the early ages of Christianity, and especially by Origen, to express an idea of divinity, and also the union of the divine spirit with matter. Long after this the word was used by Leibnitz to designate the primordial elements of all matter. In chemistry the monatomic elements, such as hydrogen, chlorine, and potassium, whose molecules are capable of uniting only with single molecules of other elements, are called monads; a number of infusorial organisms have received the name of monads. Some of these manifestly belong to the animal kingdom, some to the vegetable, while of others it is difficult to say to which kingdom they belong.

Monad'nock. See GRAND MONADNOCK.

Monagas (mō-nā'gās), José Tadeo, 1784-1868; Venezuelan military officer and politician; b. near Maturin; served with distinction under Bolívar, 1813-21, becoming general of division, 1821; led a fruitless attempt to reestablish the fallen republic of Colombia, 1831; was a presidential candidate, 1846, and was adjudged elected by Congress; was inaugurated, 1847. In January, 1848, he dissolved congress by a *coup d'état* and assumed dictatorial powers; 1851, was succeeded by his brother, and took command of the army; was reelected President for the term beginning 1855, but was forced to resign, 1858, and banished; 1868, led the revolution which deposed Falcon, and was reelected President, but died before he could assume office.

Monar'chians. See PATRIPASSIANS.

Mon'archy, government of a state by one chief only. Succession to the throne has generally been determined by heredity, but in some monarchies, as, for example, in the former King-

dom of Poland, the elective principle has been recognized. Where the will of the monarch is supreme over all other authorities in the government there is an absolute monarchy. Such a government as that of Great Britain is called a limited monarchy, from the fact that the power of the crown is subjected to constitutional limitations, and is held in check by other authorities. Absolute monarchies, which as the world advances toward freedom are becoming rarer, are now found in perfection only in the East, where were the five great monarchies of the ancient world—Chaldea, Assyria, Media, Babylonia, and Persia. See ARISTOCRACY; DEMOCRACY; OLIGARCHY.

Mon'astery, place in which monks or nuns live in seclusion. In the beginning monasteries were to be found only in solitary places; after a time some were built outside the walls of cities, and after the fifth century the cities themselves became the abode of cenobites. These houses are called abbeys when governed by an abbot or abbess, priories when ruled by a prior or prioress; and when the superior has no such distinctive title, the house is called simply a monastery, convent, or nunnery. See MONACHISM.

Monastir (mön-äs-tär'), or Bitolia (bi-tō'li-ä), chief town in the Servian part of Macedonia; 90 m. NW. of Salonica; is a place of such strategic importance that it was long the headquarters of a Turkish army; was the scene of the massacre of the Albanian beys, 1833, and of Turkish atrocities, 1903. The town was besieged and captured in December, 1915, despite Anglo-French efforts to save it, but, Nov. 19, 1916, the Servians reconquered it from the Bulgarians. Pop. (1911) 59,856.

Monck (münk), Charles Stanley (fourth Viscount), 1819-95; British statesman; b. Templemore, Ireland; called to the bar, 1841; succeeded his father, 1849; entered the House of Commons, 1852; was a lord of the Treasury, 1855-57; Governor General of Canada, 1861-68; received a seat as a baron in the House of Lords, 1866; became, 1871, a commissioner of the Irish Church temporalities, and was Land Commissioner, 1882-84. During his service in Canada the Dominion was established.

Mon'day, signifying "moon day," the second day of the week. Dion Cassius, who wrote abt. 220, says that "the practice of referring the days of the week to the seven planets began among the Egyptians," and had been but recently adopted by the Roman world.

Mondovi (mön-dō-vē'), town of Cuneo, Italy; 42 m. S. of Turin; surrounded by ancient walls. In 1796 occurred in this neighborhood the engagement known as the battle of Mondovi, in which Bonaparte defeated the Piedmontese army, and thus prepared the conquest of all upper Italy. Pop. of commune (1901) 19,255.

Monet (mō-nā'), Claude, 1840- ; French landscape painter; b. Paris; received early instruction from Boudin; served in the army in Algiers; became recognized as the chief of modern impressionist landscape painters in France; his best works depict scenes in Normandy.

Mon'etary Standards, standards of value, i.e., exchange value, embodied in some form of money. Three such standards are now familiar—gold alone, silver alone, and gold and silver used together, forming a bimetallic standard and the basis for a system of bimetalism. In most or all countries having the sole gold standard silver is also used in some subordinate relation, either for full legal-tender money, as in the U. S., Germany, and France, or for subsidiary coins alone, as in Great Britain. Most countries having the silver standard employ more or less gold for trade with gold lands, buying and selling it as a commodity. Bimetallic money is money constituted by admitting both gold and silver to free coinage, and making each an unlimited legal tender at a certain relation in value to the other. This system must be carefully distinguished from the mere use of full legal-tender silver along with gold (legal-tender tokens), as in the U. S., Germany, and France. That does not constitute bimetalism, because silver is not in those circumstances open to free coinage.

The use of two metals requires the establishment of a legal ratio between them, giving debtors the option of paying, for example, either 1 oz. of coined gold or 15½ oz. of coined silver for an equal sum, the mints of the country being open at all times to the coinage of either metal in unlimited amounts for private persons. Concurrent circulation of the two metals can continue only so long as the market ratio coincides with the legal ratio. When 1 oz. of gold, as in the example cited, comes to be worth a little more than 15½ oz. of silver, gold will be exported or withdrawn from general circulation. If the market ratio turns the other way, silver will be exported and gold will be retained. According to Gresham's Law (*g.v.*), if one of two metals used in the currency of a country becomes cheaper for any reason, this metal tends to drive the dearer metal out of circulation. The monetary history of nations consists mainly of these changes and of the recoinages to which they led.

Monometallism is the use of only one metal as money of full legal tender, either gold or silver. Gold is the monetary standard to-day in all countries with the exception of the Straits Settlements, the Malay states, Ceylon, Japan, Bolivia, the Central American states (exclusive of Costa Rica and British Honduras), and China, wherein silver is the standard.

Mon'ey, standard by which wealth is measured, and an instrument by which one kind of wealth can be exchanged for another. Money differs from currency; while currency is anything with which commodities can be bought and debts canceled, it does not always have an intrinsic value, but may be, as in the case of bank bills or government notes, merely a voucher or representative of value, in which case it is not money. Money is that kind of currency which has an intrinsic value, and which thus, if not used as currency, would still be wealth. Any article of wealth—i.e., anything which has value—may be used as money. Tin was thus employed in ancient Syracuse and Britain, while to the same purpose we find iron in Sparta, cattle in Rome and Germany (*pecu-*

nia, from *pecus*, cattle), a preparation of leather among the Carthaginians, platinum in Russia, lead in Burma, nails in Scotland, pieces of silk among the Chinese, cubes of pressed tea in Tartary, salt in Abyssinia, cowrie shells on the coast of Africa, slaves among the Anglo-Saxons, tobacco in Virginia, codfish in Newfoundland, bullets and wampum in the early history of Massachusetts, logwood in Campeache, sugar in the W. Indies, soap in Mexico, etc.; but from the time of Abraham, when he paid (Gen. xxiii, 16) to the children of Heth 400 shekels of silver, "current money with the merchant"—the earliest historical record of a purchase with money—till now, gold and silver have been the money of the world with civilized and commercial people.

These metals possess some singular advantages which explain why they are used as money. They are intrinsically valuable, everybody in the civilized world desiring gold and silver, not simply as money, but for ornaments and other uses, and no one being able to obtain them without labor. They have both the elements, therefore, of true value. Besides this, they wear out very slowly; they are easily divisible and malleable, and can be readily alloyed and refined; they are largely distributed over the globe, and are yet of sufficient scarcity; they are of the same quality wherever found, and are subject to fewer fluctuations in value than any other commodity known. This last quality is a prime requisite in money.

In order that money may be a standard of value as well as an instrument of exchange, its own value must be invariable—a condition in which gold and silver better conform than any other commodity, but in which any currency not convertible into these necessarily fails. When bank notes or government notes become currency without a corresponding basis of money, nothing has ever been able to prevent their fluctuation in value and the consequent effect upon all other values. The temptation to increase these issues according to the fancied interest of the bank or the government is always likely to prove irresistible, in consequence of which the community employing them finds itself flooded with a currency upon which all values float with an unsteady motion, and any standard of value is out of the question. See COINAGE and CURRENCY.

Monge (mōnz), Gaspard, 1746–1818; French mathematician; b. Beaune. While teaching at Mézières his experiments in physics and chemistry, and investigations into the principles of geometry, led to the foundation of what he called descriptive geometry, on which he published a celebrated work. He first applied the differential calculus to the general theory of surfaces. He was afterwards a professor in Paris, was instrumental in the establishment of the Normal and Polytechnic schools, taught in both, accompanied the army into Italy and Egypt, and was president of the Egyptian Commission, head of the polytechnic school, and member of the Senate till the fall of Napoleon.

Monghyr (mōn-gēr'), town of British India, presidency of Bengal, on the Ganges; 80 m. ESE. of Pitua; is noted both for its beautiful

situation on a rocky height at a bend of the river, and for its salubrious climate; is fortified, and manufactures hardware, cutlery, and firearms of a low grade. The whole district in which it is situated, and of which it forms the administrative center, is noted for its manufacture of cheap iron goods. There are also factories of textiles, dyes, soaps, glassware, boxes, furniture, shoes, and idols. Much *ghi* or native butter is exported. Pop. (1901) 35,883.

Mongolia, land of the Mongols: a Chinese possession in central Asia; bounded on the N. by Siberia, on the E. by Manchuria, S. by China proper, and on the W. by Chinese Turkestan; area, 1,367,000 sq. m.; pop. abt. 2,600,000. There is no natural boundary between Manchuria and Mongolia. A line of palisades (still shown on some maps) formerly marked the dividing line, but it no longer exists. A large portion of Mongolia is occupied by the great desert of Gobi, a desolate and sterile tract of almost treeless country, extending NE. and SW. between the 90th and 120th meridians of E. lon., in some places exhibiting a considerable depression, and in some parts more than 200 m. in breadth. Generally this desert is a level land, and though, on the whole, at an average elevation of 2,600 ft. above the sea, there are but few hills of any altitude. On the other hand, the Alashan country to the S. is mountainous and well wooded. On the W. side of these hills the great river Hwang-ho runs for nearly 400 m., and some peaks, beyond where the Hwang-ho forces its way E., are covered with perpetual snow, and are probably not less than 10,000 to 12,000 ft. high. To the N. and NW. chains of high mountains separate Mongolia from Siberia, the range of Altai being the most famous. This, which is the richest portion of Mongolia, is chiefly in the hands of the Buddhist monks, the high priest himself residing at Urga. Though better watered than other parts of Mongolia, and the source of some considerable rivers, such as the Amur and the Orkhon, the intense winter cold renders the rearing of even the commonest and hardest vegetables almost impossible.

Owing to the peculiar character of their country, the Mongols are now, as they have ever been, essentially nomadic. By far the largest number of the population dwell in tents, and their chief possessions are large herds of camels, horses, sheep, asses, and mules. The Mongols are middle-sized, strong, and active; their skin of a dark-yellow hue; their faces broad, with flat noses and projecting ears. They have little beard, and generally shave off what they have except one tuft. They belong to the great group now often called Turanian, and are thus allied to the Chinese, Tibetans, and the Japanese, and more remotely to the Eskimos, Samoyedes, Lapps, Turks, and Magyars; in other words, to nearly two thirds of the whole human race. In ancient history we find their ancestors under the generic title of Scythians or Cimmerians, and the founders of the Median Empire, whose cuneiform writings we are even now only partially able to decipher; in later times they ap-

pear as the terrible and devastating Huns, and still later as the scarcely less ferocious warriors of Genghis Khan and Timour.

Mon'goose. See MUNGOS.

Mon'ism, philosophical term denoting a theory that holds one ultimate being in the universe. Dualism holds two ultimate principles, for example, mind and matter. See DUALISM.

Mon'ition, in the practice of the English ecclesiastical courts, the mildest form of ecclesiastical censure—simply an order admonishing the person complained of to do something specified in the instrument "under pain of the law and penalty thereof."

Mon'itor, name of a genus of large Old World lizards, some of which approach the size of alligators. The typical species, the Nile monitor (*Monitor niloticus*) attains a length of 6 ft., half of this consisting of the slender tail. The animal is gray, with dark blotches. It is believed by the natives to be hatched from crocodile's eggs, but in reality these form a portion of its food. The great lizards of the S. American



MONITOR.

family *Teiidae* are often called monitors, and indeed closely resemble the true monitors.

Monitor, name given the first vessel of a special class of nearly submerged armored vessels, invented by John Ericsson, the principal



THE "MONITOR." }

features of which are a revolving turret protecting guns of large caliber, and an overhang deck protecting the propeller and rudder.

Plans for such a vessel were submitted by Ericsson to Napoleon III, 1854, but were rejected, and the first vessel of the sort ever constructed was built under contract with the U. S., for use in blockading S. ports in the Civil War of 1861-65. It was named *Monitor* by Capt. Ericsson, was launched at Greenpoint, Long Island, January 30, 1862, and went to sea March 6th in command of Lieut. John L. Worden, U. S. navy, with a crew of forty-five men and twelve officers. The *Monitor* had an iron hull with wooden deck beams and side



THE BATTLE BETWEEN THE "MONITOR" AND THE "MERRIMAC."

projection, and was armed with two 11-in. shell guns. This vessel fought a memorable engagement with the Confederate ironclad *Merrimac*, March 9, 1862, off Newport News, Va., neither being able to destroy the other; but the *Monitor* was successful in protecting Union shipping, and the *Merrimac* was obliged to withdraw for repairs. There was no loss of life on either side. The *Monitor* foundered off Cape Hatteras December 31, 1862.

Monk, George. See ALBEMARLE, GEORGE MONK.

Mon'key, a name applied in a general way to any of the order *Primates* except man, but generally understood to mean one of the smaller, tailed species of *Anthropoidea* in distinction to the larger apes and baboons on the one hand and lemurs on the other.

Monk Seal, popular name of a large seal (*Monachus albiventer*) found in the Mediterranean, and S. in the Atlantic to the Canaries. It is of a dark-brown color, dirty yellowish white beneath, and attains a length of 5 to 6 ft. An allied species (*M. tropicalis*) occurs in the W. Indies, and these two are peculiar as being the only earless seals (*Phocidae*) found in warm latitudes.

Monks'hood. See ACONITE.

Mon'mouth, James Scott (Duke of), 1649-85; English military officer; b. Rotterdam, Holland; illegitimate son of Charles II and Lucy Walters; after his father's restoration was created Duke of Monmouth; 1663, married the Countess of Buccleugh and assumed her surname; 1670, became captain general of all the king's fortresses and a privy counselor; later commanded the armies of England in Scot-

land, and was known as the "Protestant Duke." He defeated the Scotch Covenanters at Bothwell, June 22, 1679, but was accused of favoring rebellion, and retired to Holland. Returning to England, he headed the opposition to the court, and the project of making him successor to the crown was strongly pressed. The part which Monmouth had in the conspiracies of 1683 led to his flight to Holland. When Charles II died, 1685, he attempted to obtain the crown, and headed a small expedition, which arrived at Lyme-Regis June 11th. His forces were beaten at Sedgemoor, July 6th; on the 8th he was captured and taken to London; on the 15th was executed.

Monmouth, Battle of, engagement between the American forces under Washington and the British under Sir Henry Clinton, at Freehold, Monmouth Co., N. J., June 28, 1778. On June 18th Clinton evacuated Philadelphia and marched toward Brunswick, with a view of embarking on the Raritan. Washington broke camp at Valley Forge, and started in pursuit. The evening of the 27th found the main body of the enemy encamped near Monmouth Courthouse, while the American advance, about 4,000 strong, under Gen. Charles Lee, was at Englishtown, 5 m. distant, with the main body about 3 m. in the rear. Early on the 28th Lee engaged the rear division of the enemy, but soon began a disorderly retreat, closely followed by the British. Washington advanced with the main body, reprimanded Lee and rallied the fugitives, and opened an effective cannonade. The enemy at length fell back, and during the night Clinton effected a noiseless retreat. The American loss was 69 killed and 160 wounded; that of the British probably nearly 300 killed and 100 prisoners, including wounded. Lee was suspended for twelve months on the grounds of disobedience, disrespect, and misbehavior. Later he wrote an impertinent letter to Congress and was dismissed from the service.

Monnier (mō-nō-ā'), Marc, 1829-85; French scholar and writer; b. Florence, Italy; lived in Naples, 1855-64; then removed to Geneva, Switzerland, becoming correspondent for Parisian journals, and soon after Prof. of Comparative Literature in the university. Author of "The Ancestors of Figaro," a study in the history of the drama; "Geneva and her Poets"; "The Renaissance, from Dante to Luther"; "The Reformation, from Luther to Shakespeare"; a translation of Goethe's "Faust"; a "Life of Jesus," in verse, etc.

Monochrome. See CAMAIEU.

Monocotyledons, subclass of higher flowering plants (Angiosperms), characterized by having their leaves from the first, alternate (the lowermost, or first leaf, *cotyledon*, is thus single), the veins of the leaves mostly parallel, the parts of their flowers commonly in threes, and the woody bundles in their stems separate, and arranged with seeming irregularity. Characteristic Monocotyledons are the lilies, orchids, palms, and grasses, many of which are among the most useful and best-

known plants in the vegetable kingdom. Eight orders of Monocotyledons are pretty well defined, including from thirty to thirty-five families. There are now known about 20,000 species. See ACOTYLEDONOUS PLANTS; DICOTYLEDONS.

Monod (mō-nō'), Frédéric Joël Jean Gérard, 1794-1863; French theologian; b. Monnaz, Switzerland; succeeded his father, Jean Monod (1765-1836), in the pastorate of the National Protestant Church of the Oratoire, Paris, but seceded, 1848, and became the founder of the Free Church of France.

Monogram, character or cipher formed by the combination of two or more letters of the alphabet. Monograms were common in antiquity, and their use was almost universal at the beginning of the Christian era. The Christmon or monograph of Christ, with which coins, seals, rings, lamps, vases, tombs, paintings, and ecclesiastical documents were ornamented in the Middle Ages, is a combination of the Greek letters X and P, and represents the first two letters of ΧΡΙΣΤΟΣ.



MONOGRAM.

Mo'no Lake, body of water in central California, E. of the Sierra Nevada; is without outlet and of variable area, one measurement showing a diameter of 13½ m. from E. to W., and 11 m. from N. to S., with area of about 85 sq. m., and mean depth of 61 ft. It was formerly 680 ft. deeper than now, as shown by ancient beaches, and had an area of 316 sq. m. It is 6,380 ft. above sea level. The water is so intensely saline and alkaline that it is uninhabited by fishes, but it swarms with the larvæ of insects and with small crustaceans known as brine shrimps.

Monomet'allism. See MONETARY STANDARDS.

Monongahe'la River, stream which rises in Randolph Co., W. Va.; flows N. 300 m. in a tortuous course, and joins the Allegheny to form the Ohio at Pittsburg, Pa. It is navigable by slack-water improvements 106 m. to Morgantown, W. Va., and 200 m. for keel boats. The navigable Youghiogheny is its most important tributary.

Monoph'ysites, followers of Eutyches, who maintained that in Christ there is "only one nature, that of the incarnate Word," his human nature having been absorbed by the divine, "like a little honey mingled with the ocean." His opinion, condemned, 448, at Constantinople, was reaffirmed by the "Robber Synod" of Ephesus, 449, through the influence of Dioscurus, Bishop of Alexandria, and his partisans, aided by the Abbot Barsumas and his Syrian monks, but especially through the active support of the Emperor Theodosius II. This decision was reversed, 451, by the General Council of Chalcedon. The great patriarchal sees of Alexandria, Jerusalem, and Antioch fell into the possession of the Monophysites, and the interference of the Greek emperors contributed to perpetuate the division.

The compromise of Zeno called *Henoticon*, 482, was rejected by both parties. Justin and Justinian employed alternately, without success, measures of conciliation and severity. Under Justinian's successor the Monophysites organized as an independent body. From Jacobus Baradaeus, Bishop of Edessa, 541, who gave them in Syria and Mesopotamia a permanent organization, they received the name Jacobites. As early as 527 the bishops of Armenia established on a Monophysitic basis an independent church, and it is even now nominally Monophysite. In Egypt nearly all the churches adopted Monophysitism, and it continues in Egypt to this day.

Mon'oth'eism, doctrine or belief that there exists but one God, as distinguished from polytheism, which teaches the existence of more than one divinity. Judaism, Christianity, and Mohammedanism are the principal monotheistic religions.

Monoth'elites (Gr., "single-will"), sect who maintained that in Christ there was but one will, while they admitted the doctrine of two whole and distinct natures. The origin of Monothelitism was due to the effort made by the Emperor Heraclius to conciliate the numerous Monophysite churches, in the edict called "Ekthesis," 639, drawn up at the instance of Sergius, Patriarch of Constantinople, affirming that in Christ there is "only one mode of willing and working." The first Council of Lateran, 649, under Pope Martin I, condemned the Monothelites. After the elevation of Anastasius II to the throne, the sect maintained itself only in a corner of Asia, where they ultimately united with the Roman Catholic Church, under the name of Maronites.

Monotocard'ia, a division or suborder of the gasteropod mollusca frequently called Pectinibranchia. It comprises a large number of species, most of which are marine. These are all united by the fact that the heart has a single (left) auricle (whence the name), and a single featherlike (pectinate) gill is present. There is but a single renal organ, and usually the left anterior mantle fold is greatly prolonged and more or less completely rolled into a tube (siphon) through which water is drawn for respiratory purposes, and which frequently leaves its impress on the shell as a groovelike outgrowth or canal from the anterior margin of the lip. The Monotocardia are subdivided by systematists upon characters chiefly derived from the lingual ribbon.

Monotrem'ata (Gr., "single-opening"), order of mammals; named from the fact that the intestinal, generative, and urinary organs have a common opening, as in birds and reptiles. The order includes the ornithorhynchus and the porcupine ant-eaters from Australia and Tasmania. They are the lowest mammals, and have many characters of birds and reptiles. See DUCKBILL; ECHIDNA; ORNITHORHYNCHUS.

Mon'otype. See TYPESETTING MACHINES.

Monreale (mōn-rā-ā'lā), town in province of Palermo, Sicily; 4 m. SW. from Palermo city; has little of interest except its cathedral, one

of the most splendid temples in the world. The interior, 325 ft. long and 125 broad, consists of three naves supported by gigantic columns of Oriental granite, with capitals of exquisite workmanship. Adjoining the cathedral is the great monastery of the Benedictines. The terrible massacre known as the Sicilian Vespers, 1282, began on the road from Palermo to Monreale. Pop. of commune (1901) 23,778.

Monroe', James, 1758-1831; fifth President of the U. S.; b. Westmoreland Co., Va.; son of Spence Monroe, and a descendant of a Scottish Cavalier family; educated at William and Mary College; entered the Revolutionary army, 1776; served with distinction in the principal engagements of 1777-78; studied law under Jefferson; served again in the latter part of the war; and was delegate to Congress, 1783-86. He desired the extension of the powers of Congress, and, 1785, moved to confer on that body the authority to regulate interstate trade. The adoption of this resolution led to the calling of a convention at Annapolis, and ultimately to the formation of the Constitution. Monroe, however, as delegate to the Virginia Convention, 1788, opposed the adoption of the new instrument by his native state, and as U. S. Senator, 1790-94, he supported the Antifederalist Party. He was minister to France, 1794-96, and Governor of Virginia, 1799-1802. He was sent as envoy extraordinary to France, 1802, and with Livingston, the minister resident, negotiated the Louisiana Purchase. He was minister to Great Britain, 1803-8, and, 1805, undertook a special mission to Madrid to settle the boundaries of the new purchase. He failed in this, and the treaty which he negotiated with Great Britain was not acceptable to the U. S. Govt. Returning home, 1807, he published an elaborate defense of his course as a diplomat. In 1811 he was again elected Governor of Virginia. He was Secretary of State, 1811-17, and Secretary of War, 1814-15. In 1817 he was elected President over Rufus King, the Federalist candidate, and, 1820, was reelected by the almost unanimous vote of the electoral college. The chief events of this prosperous administration, "the era of good feeling," were the conclusion of a convention with Great Britain relating to the Newfoundland fisheries, 1818, the acquisition of Florida from Spain, 1819, the establishment of a system of internal improvements, the enunciation of the Monroe Doctrine, the Missouri Compromise of 1820, the recognition of the independence of the Spanish-American states, and the last visit of La Fayette to the U. S. In 1831 Monroe removed to New York, where he died.

Monroe, capital of Monroe Co., Mich.; on the Raisin River; 35 m. S. of Detroit; has extensive nurseries and vineyards, and manufactures flour, lumber, and sash and blinds. After the battle of Raisin River between an American force and the English and Indians, 1813, several hundred American prisoners were massacred here. Pop. (1910) 6,893.

Monroe Doc'trine, a declaration of the policy of the U. S. in opposition to the interference

of European powers in the political affairs of the American continents, made by Pres. Monroe in his message to Congress, 1823. At the Congress of Verona, 1822, a project had been discussed of aiding Spain to recover dominion over her revolted American colonies. It was by the influence of Canning, then Secretary for Foreign Affairs, that the British Govt. in 1822 was led to take energetic measures against the absolutists' principle of interference in preventing revolution and all political changes proceeding from the people in opposition to the rulers. France, early in 1823, was ready to invade Spain for the purpose of overthrowing the revolutionary government. The next measure was likely to be an attempt to subjugate the Spanish colonies, some of which the U. S. had recognized as independent nations. The British Govt. is understood to have suggested to the U. S. the policy of making some protest against such interference in the affairs of the American states or colonies. The suggestion being approved of by the President, by J. Q. Adams, Secretary of State, and by Jefferson, who was consulted, the annual message of December, 1823, contained the following declarations: "That we should consider any attempt (on the part of the allied powers) to extend their system to any portion of this hemisphere as dangerous to our peace and safety," and "that we could not view any interposition for the purpose of oppressing (governments on this side of the water whose independence we had acknowledged), or controlling in any manner their destiny by any European power, in any other light than as a manifestation of an unfriendly disposition toward the U. S." This declaration, together with the known sentiments of the British cabinet and nation, put an end to any designs which may have been entertained looking toward armed interference in American affairs.

Monroe, Fort. See FORT MONROE.

Monro'via, capital of the Republic of Liberia, Africa; on the Atlantic Ocean at the mouth of the St. Paul River; is the seat of Liberia College and of American mission institutions; is the chief port of the republic; is visited regularly by seven lines of steamships; and exports rubber, palm oil, palm kernels, cocoa, coffee, ivory, dyewoods, ginger, etc. Pop., including Krutown (1905), est. at 8,000.

Mons (môns), capital of province of Hainaut, Belgium; on the Trouille; 38 m. SSW. of Brussels; is strongly fortified; has a beautiful cathedral, and extensive manufactures. As an important strategic point it figures prominently in the history of the wars between Spain and the Netherlands, France and Spain, and France and Austria. In the World War, what is known as the battle of Mons, said to have been a more stubborn contest than that of Waterloo, occurred at Mons-Charleroi, nearby, Aug. 21-23, 1914. The German invaders forced the British and French into a prolonged retreat, but Nov. 11, 1918, the city was retaken by the Canadians. (Pop. (1913) 27,805.

Monserrat'. See MONTSERRAT.

Monsoon', a seasonal interchange of wind between continent and ocean—an annual land and sea breeze, and especially an intertropical wind which blows part of the year from one point of the compass, and the remainder of the year in a contrary direction. These winds are more particularly known in the seas adjoining the great Asiatic continent and archipelago, including Papua and the N. part of Australia, whence they extend to about lon. 160° E. The causes are, in theory, the same as those which cause the trade winds.

Mont, Ment, Month, Men'thu, Egyptian god of war, who was especially worshiped in Hermonthis (Erment) and Thebes. He was variously represented as a hawk-headed deity, though he sometimes wore the head and horns of a bull which was sacred to him under the name of Bakh, the Bachis of the classics. He is also occasionally pictured with the head-dress peculiar to Amon. In later times he was identified with the sun god Ra, as Mont-Ra.

Montagnards (môn-tân-yâr'), French, "mountaineers," or THE MOUNTAIN, in the first French Revolution; name sometimes given to the ultrademocratic members of the National Convention, so called because they originally sat in the highest seats of the hall. The Girondists were, in distinction, called the Plain; and after their destruction the lower part of the house was called the Marsh, and was occupied by the undistinguished rabble of Jacobins, the leaders retaining the high seats.

Mon'tagu, Basil, 1770-1851; English lawyer; b. London; natural son of John Montagu, fourth Earl of Sandwich. In 1806 he became a commissioner of bankrupts, and after some years procured the passage of a reformed bankruptcy law, under which he was appointed accountant general. He published forty volumes, including several against capital punishment. His principal professional work is "A Digest of the Bankrupt Laws." He edited Bacon's works, with a life.

Montagu, Elizabeth Robinson, 1720-1800; English author; b. York; was married, 1742, to Edward Montagu, grandson of the fifth Earl of Sandwich, and cousin of Edward Wortley Montagu, the husband of Lady Mary, and became a celebrated leader of London society. She gave a famous annual dinner on May Day to the London chimneysweepers, and her magnificent residence in Portland Square was the headquarters of the so-called Blue-stocking Club. Mrs. Montagu wrote three of the "Dialogues of the Dead," published in the fourth edition of Lord Lyttleton's work bearing that title, and an "Essay on the Writings and Genius of Shakespeare compared with the Greek and French Dramatic Poets" (1769), but is best known by her "Correspondence."

Montagu, Lady Mary Wortley, 1690-1762; English writer; b. Thoresby, Notts; daughter of the Earl of Kingston; 1712, married Edward Wortley Montagu, without her father's consent; 1716, went to Constantinople with her husband, then ambassador to the Porte; 1717, made a successful trial of inoculation for

smallpox on her only son—a practice unknown before her time in W. Europe; 1739, left her husband, and resided chiefly in Italy. She is remembered best for her brilliant "Letters," written during her travels.

Montaigne (mōn-tāñ'), **Michel Eyquem** (Seigneur de), 1533-92; essayist; b. near Bergerac, in Périgord, France. He was educated with great care, first at home, where he learned Latin at the same time with French, then at Bordeaux. He was a precocious student, and at fifteen was studying law. In 1554 he took his seat as counselor in the Parliament of Bordeaux, where began his great friendship for Étienne de la Boétie. He had little taste for public affairs, and after his father's death resigned (1570) his office. In 1569 he had published a translation of the "Theologia naturalis" of Raimond Sebond, and in 1571 he edited the posthumous works of his friend La Boétie. In 1580 he issued the first two books of "Essais," and in the same year set out on a series of travels in N. France, Germany, Switzerland, and Italy. His interesting but not remarkable journal of this tour was published in 1774.

While still in Italy (1581) he was chosen Mayor of Bordeaux, and discharged the functions of that office with success, in difficult times of civil dissensions, till 1585, when, shortly before laying down his office, he exposed his character to serious imputations by fleeing from the city while the plague was raging there. In 1588 he published in Paris a fifth edition of the "Essais," enlarged by the addition of a third book. In the following year he was somewhat obscurely connected with political events. The "Essais" are familiar discourses with the reader, whom he takes completely into his confidence about what he has done and seen, read and thought, set down in a sort of willful disorder, and as far as possible from a systematic philosophy. They are written in a rich, varied, and exceedingly personal style, capable of the utmost easy familiarity and of serious and sustained eloquence. By it Montaigne holds rank as one of the masters of French prose.

Montalembert (mōn-tā-lān-bār'), **Charles Forbes de Tryon** (Comte de), 1810-70; French publicist and statesman; b. London; son of the Marquis Marc René de Montalembert, and grandson of the engineer Montalembert; became, 1830, with Lamennais and Lacordaire, one of the founders of *L'Avenir*, a democratic journal, but, after the papal condemnation of that paper, did not follow the radical evolution of Lamennais. He entered the hereditary Upper House, 1835, and developed great power as an orator in support of ecclesiastical measures. When the Revolution of 1848 came he entered the Assembly, eventually joining the Reactionary group, and becoming one of the most dangerous antagonists of the Empire of Napoleon III. In 1857 he retired to private life, but remained influential in clerical circles, opposing persistently the acceptance of the dogma of Papal Infallibility. His works comprise "Life of St. Elizabeth of Hungary," "The Monks of the West," "The Political

Future of England," "The Free Church in the Free State."

Montalembert, Marc René (Marquis de), 1714-1800; French military engineer; b. Angoulême; entered the army at the age of eighteen, and served at the sieges of Kehl and Philippsburg and in the war with Bohemia. Subsequently he engaged in the manufacture of cannon for the French navy. At the age of sixty-two he began to publish his great work, "Perpendicular Fortification."

Monta'na (state flower, bitter root), state in the W. (Rocky Mountain) division of the American Union; bounded N. by Alberta and Assiniboia, Canada, E. by the Dakotas, S. by Wyoming and Idaho, W. by Idaho; average length E. to W., 470 m.; average breadth N. to S., 275 m.; area, 146,997 sq. m.; pop. (1910) 376,053, including 10,814 Indians; cap-



ital, Helena. Butte, Great Falls, Anaconda, Missoula, Dillon, and Bozeman are important cities.

Although the state is mountainous, there are some fine valleys, and it has an abundance of timber, such as pine, spruce, cottonwood, and aspen. The streams are skirted with dense thickets, in which there is found plenty of serviceberries, currants, and gooseberries. The Bitter Root range of mountains forms the SW. boundary; the main chain of the Rocky Mountains turns N. at the SW. corner, and forms between the two ranges a great basin, which constitutes one fifth of the entire area of the state. Mount Douglas, the highest elevation in the state, has an altitude of 11,300 ft. About three fifths of the state consists of rolling table-lands in the E., which are generally treeless and often ill adapted to irrigation. The streams which traverse these table-lands, however, are generally lined with cottonwood, willow, and other similar trees. The principal rivers are the Gallatin, Jefferson, and Madison, here called the Three Forks, which unite and form the Missouri. Besides these are the Yellowstone, Musselshell, Milk, Teton, Sun, and Maria's rivers, etc. Flathead Lake is the only considerable lake. The Yellowstone National

Park is partly within Montana. The climate is healthful. Little rain falls, and in most of the state irrigation is necessary. Much snow falls on the mountains, particularly in the NW. basin. The average yearly temperature of the valley regions is about 48°, the mercury rarely rising above 80° in summer, but in some parts often descending to 40° below zero in winter.

Gold has been found in every portion of the state; silver ore, iron ore, lignite coal, copper, lead, grindstones, petroleum, zinc, marble of several varieties, and sapphires are among the other minerals; total value mineral products (1910), \$54,388,117, including copper, \$35,950,966. Principal farm crops (1911), wheat, 12,299,000 bu.; corn, oats, barley, rye, flaxseed, potatoes, and hay were also important crops. As a grazing country Montana will always maintain a high rank, the "bunch grass," so excellent for cattle, covering all the hillsides and plains. Indeed, many herds are turned out in the autumn to get their own living through the winter, and springtime finds them in good condition. The state possesses more sheep and produces more wool than any in the Union. In 1911 there were 4,650,000 sheep, producing 12,903,750 lb. of scoured wool, valued at \$6,968,025. The number of horses was 347,000; milch cows, 91,000; other cattle, 732,000; swine, 143,000. The refining and smelting of copper and lead, slaughtering and meat packing, and the manufacture of lumber and timber, foundry and machine-shop products, flour and grist, and malt liquors are important industries; factory establishments (1909), 677; capital employed, \$44,588,000; value products, \$73,272,000.

The leading educational institutions: State Univ., Missoula; State School of Mines, Butte City; State Normal School, Dillon; State Deaf and Dumb School, Boulder City; Montana Wesleyan Univ., Helena.

Montana had had a few settlers, mostly trappers and hunters and some missionaries, for many years before its organization as a territory, but its growth dates from the discovery of gold there, 1861. It was a part of Idaho Territory till May 26, 1864, when it was organized as a separate territory. After the discovery of gold, people flocked in from all quarters. It was once a favorite hunting ground for hunters and trappers, and Fort Benton, on Missouri River, at the head of navigation, was a fur-trading post. The territory was admitted to the Union as a state, November 8, 1889. On October 15, 1892, the surplus lands of the Crow Indian reservation, in S. Montana, aggregating about 1,800,000 acres, were opened to settlement.

Montanelli (mōn-tā-nēl'le), Giuseppe, 1813-62; Italian statesman and poet; b. Fucecchio, Tuscany; practiced as an advocate, 1837-39; edited in Pisa the *Italia*, a journal, 1847; became Prof. of Civil and Commercial Law in the Univ. of Pisa, 1848; took part in the Revolution of 1848, and served with valor in the field; on the flight of the grand duke, 1849, was chosen triumvir with Guerazzi and Mazzini. When the restoration took place he went into exile, returning 1859. He published vol-

umes of memoirs, "Camma," a tragedy, lyric poems, etc.

Mon'tanists, sect of the second century, so called after Montanus of Phrygia, who abt. 160 announced himself as a prophet who was to carry Christianity to perfection. He taught a permanent extraordinary influence of the Paraclete, manifesting itself by prophetic ecstasies and visions, demanded the most rigid asceticism, and represented the beginning of the millennium as very near at hand. His followers found a zealous and gifted advocate in Tertullian. They were opposed especially by the Alexandrian school. They were numerous in Asia Minor, and also in Constantinople and Carthage.

Montauk (mōn-tāk') Point, high, fertile headland, the extreme E. point of Long Island; a part of the township of E. Hampton, Suffolk Co., N. Y. It was the seat of the Montauk Indians, now extinct, and of the convalescent camp for soldiers returned from the Cuban campaign in the Spanish-American War, 1898.

Mont Blanc (mōn blān'), one of the Pennine Alps, 15,750 ft. high, and the highest mountain in Europe except Mt. Elbruz in the Caucasus. It is a long ellipse of granite and crystalline schists, standing at the angle where France, Switzerland, and Italy meet, the principal peak being in France. It is covered with an ice cap so thick that a horizontal shaft driven in at 40 ft. below the highest point to a distance of 75 ft. with lateral drifts did not reach the rock. From this mass of ice extend numerous glaciers down the valleys, in some cases to an elevation of only 3,600 ft. The line of perpetual snow extends down to 8,600 ft. The drainage is into both the Rhône and Po. The ascent is dangerous and fatiguing, requiring two days, starting from Chamouni (elevation 3,445 ft.) on the N., and spending the first night at Grands Mulets (11,335 ft.). An observatory for meteorologic and astronomic work was erected near the apex, 1893.

Montcalm (mōn-kālm'), Louis Joseph Saint-Veran (Marquis de), 1712-59; French military officer; b. near Nîmes; distinguished himself in the army, attaining the rank of colonel; took chief command of the French troops in Canada, 1756, and captured Fort Ontario (Oswego) and, 1757, Fort William Henry (Lake George); occupied Fort Ticonderoga, 1758, and repulsed the British under Abercrombie. On July 31, 1759, he repulsed Wolfe, on the Montmorency, Canada, and, September 13th, gave battle to the British on the Plains of Abraham in the rear of Quebec. Here Wolfe fell, victorious, and here Montcalm received a mortal wound.

Mont Cenis (mōn sé-né'), mountain pass of the Alps; on the boundary between the Italian province of Turin and the French department of Savoie, at the junction of the Graian and Cottian Alps; forms a plateau 6,773 ft. high, with a peak 11,451 ft. high. In 1803-10 Napoleon I laid a carriage road over the plateau, connecting France with Italy. The famous tunnel was begun 1857, completed 1870, and opened for traffic 1871. It is 8 m. long, lack-

ing only 30 yds. The cost was £3,000,000. Trains run through in about twenty minutes. See *FRAËJUS*, COL DE.

Mont de Piété (dè pè-à-tā'), Fr., *Mount of Pity*, or *Compassion*, institution for loaning money at a low interest to the poor, pledges being taken for security. The earliest seems to have been that of Padua, founded 1491. The *Monti di Pietà* at Rome are among the best managed in the world. The *Mont de Piété* may be regarded as a public system of pawnbrokerage. A similar system has prevailed in China for ages.

Monte Carlo (môn'tā kār'lō). See *MONACO*.

Monte Cassino (kās-sē'nō). See *CASSINO*.

Monte Cristo (krēs'tō), Italian island, between Corsica and Tuscany, 30 m. S. of Elba; rendered famous by Alexandre Dumas's romance, "The Count of Monte Cristo." It is a conical rock of granite, 5 m. in circumference, 2,093 ft. high; long uninhabited, but, 1874, made a penal colony.

Montefiore (môn-tā-fē-ō'rē), Sir Moses Hayim, 1784-1885; English philanthropist; b. Leghorn, Italy, of Hebrew parents; at an early age was taken to England; rose to prominence as a merchant and broker on the London Stock Exchange; in 1824 retired from business, and devoted the remainder of an unusually long life to works of charity and to the personal amelioration of the condition of the Jews in all parts of the world. In 1837 he was knighted by the queen; 1846, a baronetcy was conferred on him. In 1846 he pleaded before Emperor Nicholas at St. Petersburg in favor of his people; 1855, brought assistance to those who were suffering from the famine in Syria; 1858, traveled over Europe in the unsuccessful endeavor to secure the release of Edgar Mortara, who had been forcibly converted to Roman Catholicism. In memory of his wife he founded at Ramsgate the Judith Montefiore College for the training of Jewish divines.

Monteleone di Calabria (môn-tā-lā-ō'nā dē kā-lā-brē-ā), town; province of Catanzaro, Italy; 11 m. E. of Tropea; occupies the site of the ancient *Hipponium* of Magna Græcia; was known under the Romans as *Vibo Valentia*, and took a prominent part in the Neapolitan wars of the Middle Ages. Pop. of commune (1901) 12,997.

Montenegro (môn-tā-nā'grō), Servian, *CRNA GORA*, "Black Mountain," a former independent kingdom of Europe; bounded by Dalmatia, Herzegovina, and Albania; area, 5,603 sq. m.; pop. (1917) 436,789; capital, Cetinje; chief towns, Podgoritz, Niksic, Dulcigno, Antivari, Kolašine, Niegosh, Danilovgrad. The country is a mass of rugged and lofty mountains, with dense forests. The loftiest peak, Kutsch-Kom, is 9,250 ft. high. The people are occupied with agriculture, hunting, and fishing. There was no standing army, but every Montenegrin between sixteen and fifty years of age owed military service, and the king could in a few days put under arms from 30,000 to 60,000 men. The exports are cattle, sheep, goats, scodano (a dyewood), insecticide powder, smoked meat,

fish, cheese, skins, and wool. When Serbia was conquered by Bayezid I, 1389, many of the inhabitants took refuge in the mountains under the lead of Balsha, son-in-law of the slain Servian King Lazarus, and have since maintained their independence. The country has often been overrun by Turkish armies, the inhabitants almost exterminated, and the capital several times captured and burned. The independence of the Montenegrins was formally acknowledged by the Sultan, 1878. Peter the Great made an intimate alliance with them, 1710. For more than 300 years their government was theocratic, the metropolitan (Vladika) of Cetinje exercising despotic authority; but it became a hereditary constitutional monarchy. In 1914 Montenegro declared war on Austria-Hungary in support of Serbia, attacked by Austria-Hungary.

Late in 1915 it was overrun by the Germans and Austrians; Jan. 13, 1916, the latter captured Cetinje; the seat of government was transferred to Bordeaux, France; King Nicholas I, was deposed by the National Assembly, Dec. 1, 1918; French troops occupied the capital, Dec. 22, following; and Montenegro disappeared from the map of Europe as an independent country when it became part of Serbia and so of the newly organized JUGO-SLAVIA (q.v.), April 20, 1919.

Montepin (môn-tā-pän'), Xavier Aymon de, 1824-1902; French novelist; b. Apremont, Haute-Saône; founded the newspaper *Le Canard*, 1848; contributed to the anti-revolutionary *Le Pamphlet* and *Le Lampon*, and published satirical pamphlets. He produced nearly 350 novels. Besides these, he wrote, alone or with collaborators, more than twenty plays.

Monterey (môn-té-rā'), city in Monterey Co., Cal.; on Monterey Bay; 80 m. by sea from San Francisco, with which it is connected by a line of steamships; has a capacious harbor, absolutely safe in any weather; is noted for its delightful climate; was formerly the state capital. The famous old mission church, Colton Hall, where the state constitution was signed, and the old custom house are still preserved. Pop. (1910) 4,923.

Monterey, capital of State of Nuevo Leon, Mexico; in a valley or small plain, partly surrounded by picturesque mountains of the Sierra Madre. There is a large trade, especially with the U. S., and the town has considerable manufacturing establishments, including a large one for woolen goods, breweries, tanyards, etc. The climate is dry and healthful, though warm in the summer months. A settlement was formed here probably as early as 1581; it was called Leon, 1584, when it became the capital of Nuevo Leon; and the present name was adopted, 1596. The city was captured by U. S. forces under Gen. Taylor, 1846. Pop. (1900) 62,266.

Monte Ro'sa, mountain in the Alps, exceeded in elevation only by Mt. Blanc; on the boundary between the Swiss canton of Valais and the Kingdom of Italy, at the junction between the Pennine and Lepontic Alps. It rises in nine peaks, the four central ones of which are more than 14,000 ft. high, the highest, the Dufourspitze, having an altitude of

15,217 ft. Gold, copper, and iron mines are worked. The Dufourspitze was ascended for the first time, 1855.

Montesquieu (môn-tês-kê-èh'), Charles Louis de Secondat (Baron de), 1689-1755; French historian and political philosopher; b. Château de la Brède, near Bordeaux, whence he derived the title he bore during his youth—Baron de la Brède; was educated for the law; in 1714 became Councillor of the *Parlement* of Bordeaux, and, 1716, President; acquired celebrity by his "Persian Letters," professedly written by a Persian traveling in France, and satirizing society and institutions; was elected to the Academy, 1728. He spent several years in England studying methods of government; returned, 1731; published, 1734, "Causes of the Greatness and Decadence of the Romans"; 1748, "The Spirit of Laws," his greatest work; 1750, "Defense of the Spirit of Laws," in answer to objections to the former.

Monteverde (môn-tâ-vêr'dâ), Claudio, 1568-1643; Italian composer; b. Cremona; was the first to discover and employ the chord of the dominant seventh and its inversions; also the chord of the ninth and the principle of suspensions. He composed many operas, and may be said to have originated truly dramatic music in contradistinction to the then all-prevailing contrapuntal style of the old ecclesiastical composers. In the orchestra he also made innovations and improvements. In 1608, at the performance of his "Orfeo," he employed thirty-six instruments.

Montevideo (môn-tê-vid'ê-ô), capital of Chipewa Co., Minn.; at the junction of the Chipewa and Minnesota rivers; was founded soon after the Sioux Indian outbreak, 1802, and is near the spot, now marked by an imposing monument, where Little Crow surrendered a large body of hostiles and several hundred white prisoners. Pop. (1910) 3,056.

Montevideo, capital of Uruguay; on a small bay of the N. shore of the Río de la Plata. The bay, about 2½ m. long and wide, forms the best harbor on the Plata; it is, however, open to winds from the SE., and it will not admit vessels of over 15 ft. draught; larger ships anchor in the roadstead formed by the mouth of the estuary. This is one of the handsomest cities of S. America. Among the public edifices are the cathedral, municipal building, government palace, School of Arts and Sciences, and the Solís Theater. Victoria and Villa del Cerro, on the opposite side of the bay, contain many slaughter houses and establishments for curing hides. Cerro has large drydocks. Montevideo absorbs a large portion of the commerce of Uruguay, and to some extent the trade in transit to the Parana and Paraguay rivers; numerous regular lines of steamers connect it with Europe, N. America, Brazil, Argentina, and the Pacific coast. The most important exports are hides, jerked beef, and other bovine products, and wool. The city has few important manufactures. Montevideo was founded, 1726, and during the colonial period was little more than a fort and settlement, dependent on Buenos Aires. It became the capital of Uruguay, 1828, but at

that time had only 9,000 inhabitants. Its commercial prosperity began, 1836. Pop. (1908) 316,000.

Montez (môn'têz), Marie Dolores Eliza Rosanna (Countess of Landsfeld), known as LOLA MONTEZ, 1818-61; Irish adventuress; b. Limerick; was the daughter of an ensign named Gilbert; was married, 1837, to a Capt. James, from whom she soon separated; appeared as a *danseuse* in Paris, 1840; went, 1846, to Munich, where she became mistress of King Louis and received the title of Countess of Landsfeld. She took an active part in politics, but was compelled to leave the country by the outbreaks of 1848; went to the U. S., 1851; appeared for some years as an actress and lecturer; and published her "Autobiography," besides other writings.

Montezuma (môn-tê-zô'mâ) II, also written MOTEZUMA, abt. 1476-1520; last Aztec war chief, or "emperor," of ancient Mexico; was the son of Axayacatl, a former chief; was early noted as a warrior, and, it would appear, was also a priest; was chosen to succeed his uncle Ahuizotl, 1503, at which time Tenochtitlan (Mexico) was the most powerful city of the plateau, with far-reaching authority. When Cortes landed at Vera Cruz, 1519, Montezuma sent him gifts, but tried to persuade him from going to Tenochtitlan, but, when the Spaniard insisted, received him well, believing him to be, as he pretended, an ambassador from the King of Spain. Fearing an outbreak of the people, Cortes seized Montezuma and confined him as a hostage. The people rose in revolt and attacked the Spanish quarters; at the request of Cortes, Montezuma appeared on the wall and attempted to pacify them, but was stoned, and fell back mortally wounded.

Montfaucon (môn-fô-kôn'), Bernard de, 1655-1741; French classical scholar; b. Soulaye, Languedoc; after serving in the army, entered, 1675, the Benedictine congregation of Saint-Maur; settled, 1701, in Paris; published, 1708, the "Palaeographia Græca," by which he became the founder of scientific paleography; also, "Antiquity Explained and Represented in Figures," "Monuments of the French Monarchy," and other works.

Mont'fort, Simon of (Earl of Leicester), abt. 1208-65; English statesman; b. France; son of Simon de Montfort, the vanquisher of the Albigenses; obtained the honor of Leicester, inherited from his maternal grandmother, an English lady, and, 1239, had it formally granted by King Henry III, after his marriage with the king's sister; was for many years Governor of Gascony. In England he took the part of the barons against the king in the wars of Henry III's reign; compelled the king to sign the provisions of Oxford, 1258, and, 1262, became the leader of the baronial party; dictated terms at the victory of Lewes, 1264; summoned the Parliament of 1265, at which knights of the shire and the representatives of the boroughs were admitted—the germ of the future House of Commons; became justiciary of England. He was attacked by Edward, Prince of Wales, at Evesham, and there defeated and slain.

Montfort (môn-fôr'), **Simon** (Comte de), and Comte de Toulouse, abt. 1150-1218; French military officer; took part in the fourth crusade against the Albigenses, 1208, and became famous for the unheard-of cruelty with which he suppressed this movement. In 1213 he took Toulouse from Count Raymond, but was afterwards driven from the city, and when he returned to besiege it was killed by a stone thrown from the wall.

Montgolfier (môn-gôl-fê-â'), **Joseph Michel**, 1740-1810, and **Jacques Étienne**, 1745-99; joint inventors of the balloon; b. Vidalon-lès-Annonay, France. First balloon, inflated with rarefied atmospheric air, ascended from Annonay, 1782, and the invention brought them fame and honor. Joseph also invented the water ram.

Montgomery, Gabriel (Comte de), abt. 1530-74; French military officer; was an officer in the Scotch Guards, at Paris; fatally wounded King Henry II in a tournament, 1559; traveled in Italy and in England, where he became a Protestant; returned to France and took part in the Huguenot wars, winning great distinction; began war in Normandy, but was captured and executed in Paris.

Montgomery, James, 1771-1854; Scottish poet; b. Irvine, Ayrshire; apprenticed to a grocer, but ran away, 1789, and, 1792, became clerk to Joseph Gales, a famous journalist, of Sheffield; founded *The Sheffield Iris*, which he edited, 1794-1825. In 1835 he received a pension, and declined the professorship of rhetoric at Edinburgh. His principal works are "Prison Amusements," written during an imprisonment for seditious libel; "The West Indies," an anti-slavery poem; "The World Before the Flood," "Greenland," "Prose by a Poet," "Lectures on Poetry and English Literature," "Original Hymns."

Montgomery, Richard, 1736-75; American military officer; b. Swords, Ireland; entered the English army, and, 1757, was ordered to Halifax; served in various Canadian campaigns; also fought in the campaigns against Martinique and Havana. In 1772 he sold his commission and purchased a farm at King's Bridge, now in New York City, and married Janet, daughter of Robert R. Livingston. In May, 1775, he was sent as a delegate to the First Provincial Congress in New York City, and in June was made brigadier general in the Continental army. Through the illness of Gen. Schuyler the command of the campaign into Canada devolved on him. After his successes at St. John, Chambly, and Montreal he was made major general. He was killed while leading the attack on Quebec, December 31, 1775. In 1818 his body was removed to New York City and buried in St. Paul's Chapel.

Montgomery, capital of State of Alabama and of Montgomery Co.; on the Alabama River; 180 m. N.E. of Mobile, with which it has steamboat communication all the year. It is built on the bluffs of the river, and is in an agricultural, mineral, and yellow-pine and hardwood timber region. It contains a U. S. Govt. building, handsome state capitol, city infirmary,

masonic temple, orphanage, home for widows, Loretto Academy, University School, Calhoun-Chamberlain School for Girls, and the suburban parks Riverside and Highland Hill. Extensive deposits of coal and iron are within easy reach by rail and water, and the city is connected with the heart of the timber region by a narrow-gauge railway. The river tonnage of freight averages 500,000 tons annually, and the aggregate business of the city exceeds \$40,000,000 in value annually. Besides the industries connected with the cotton, coal, iron, and timber production, there are brickyards, flour mills, and carriage and wagon, ice, candy, fertilizer, cigar, soap, paper-box, vinegar, cracker, and other factories. Pop. (1910) 38,136.

Month, period of time roughly corresponding in length to one revolution of the moon around the earth—29 days 12 hours 44 minutes 2.8 seconds. Months were at first, therefore, reckoned as alternately 29 and 30 days long, lunar months falling short of the length of a year by about 11½ days.

Montholon (môn-tô-lôn'), **Charles Tristan** (Comte and Marquis de), 1782-1853; French military officer; b. Paris; entered the army, 1798; distinguished himself in the battle of Wagram, 1809; was attached to the personal staff of Napoleon; followed him to St. Helena, and was appointed one of his executors. After 1830 he reentered the French army; took part in the attempt of Prince Louis Napoleon at Boulogne, and was condemned to twenty years' imprisonment, but regained his liberty after the Revolution of 1848, and became a member of the Legislative Assembly. In connection with Gen. Gourmand, he published "Memoirs Toward the History of France Under Napoleon, Dictated by Himself," and "Account of the Captivity of Napoleon."

Monti (môn-tê), **Vincenzo**, 1754-1828; Italian poet; b. Alfonsine, near Ravenna; became secretary to Prince Luigi Bracchi, himself secretary to Pope Pius VI; under Napoleon obtained at Milan the post of secretary of the executive directory; thence was sent to Bologna as Commissioner of the Cisalpine Republic; after the Russo-Austrian invasion, 1799, fled to Paris. He later became professor in the Brera at Milan, and, 1803, of Italian Rhetoric in the Univ. of Pavia. In 1805 Napoleon named him historian of the Kingdom of Italy. His works include the tragedies "Aristodemo" and "Galeotto Manfredi," an elegant translation of the "Iliad," the poems "Cantica in morte di Ugo Basville" (on the death of the representative of the French Republic, who had been assassinated at Rome), "La Musognia," and "La Feroniade," satiric attacks on the French Revolution.

Montmorency (môn-mô-rân-sê'), surname of an ancient and illustrious French family, traced back as far as 950 to Bouchard, Sire de Montmorency, a great French feudatory, nephew of Edred, King of England. The Montmorencies were long known as the premier barons of France, and among those of his name were six grand constables, twelve marshals, four admirals, many cardinals, generals, grand chamberlains, and other high magnates. Belgium and

Luxemburg have still several princely and ducal lines of this family. Its most distinguished members follow: ANNE (first Duc de Montmorency), 1492-1567; French military officer; b. Chantilly; was one of the leading generals in the wars of Francis I; gained renown for his gallantry at Marignano and Mézières, and was captured with Francis at Pavia, 1525. On the renewal of the war with Charles V he commanded with such success that he was appointed by Francis Constable of France. In the war with Spain he was defeated and captured at St. Quentin, 1557. During the first Huguenot wars he commanded the royal army. He was taken prisoner at the battle of Dreux, 1562, but was soon released. In 1563 he drove the English from Havre, and fought with Condé at Saint-Denis. He was fatally wounded in the latter engagement. HENRY (fourth and last Duc de Montmorency), 1595-1632; grandson of the preceding; b. Chantilly; when sixteen years old became Admiral of France and Viceroy of Canada; served with distinction in Italy and against the Huguenots; took part in the rebellion of Gaston of Orleans; and was executed by order of Richelieu at Toulouse.

Montmorency, Falls of, beautiful cascade in the Montmorency River; 8 m. NE. of Quebec. The river rises in Snow Lake, Montmorency Co., and flows S. for more than 30 m., emptying into the St. Lawrence, after being joined by Des Neiges River. About a mile above the precipice of 250 ft., over which the waters take their final leap, are the natural steps, formed by the action of the water on the rock. At the base of the steps or terraces is a narrow, water-worn channel through which the stream rushes as in a millrace over cascades and through seething pools. The road to the falls passes through the struggling village of Beaufort, the headquarters of Montcalm, 1759, when he prevented Wolfe from landing.

Montpelier (mōnt-pē'l-ēr), capital of the State of Vermont and of Washington Co.; on the Winooski River; 40 m. SE. of Burlington; was made the state capital, 1805; principal industry, the quarrying of the celebrated Barre granite; other industries, the manufacture of sawmill, candy-making, and other machinery, leather, organ and piano springs, and clothes wringers and washing machines. Besides the granite Capitol, surmounted by a statue of Agriculture, the city contains a U. S. Govt. building, Wood Art Gallery, Washington Methodist Seminary, Heaton Hospital, Montpelier and Kellogg-Hubbard libraries, and other institutions. Pop. (1910) 7,856.

Montpellier (mōn-pē'l-lyā'), capital of the department of Hérault, France; on the Lez; 6 m. N. of the Mediterranean and 76 m. WNW. of Marseilles. Its promenades afford the most splendid views of the Mediterranean, the Pyrenees, and the Alps. Remarkable among its buildings are the cathedral and the aqueduct, and among its institutions its medical school, founded in the Middle Ages by Arabian physicians and, 1289, incorporated, with its schools of law and arts, as a university; a botanical garden, the first established in France, and

many excellent collections are connected with the school. Montpellier has large distilleries and manufactures of woollens and cottons, and it carries on an important trade in wine, olive oil, fruits, and grain. Pop. (1906) 77,114.

Montpensier (mōn-pān-sē-ā'), Anne Marie Louise d'Orléans (Duchesse de), known as Grande Mademoiselle, 1627-93; French princess; daughter of Gaston, Duke of Orleans, brother of Louis XIII. During the wars of the Fronde, 1649-52, she sided with the Frondeurs, and showed masculine boldness and capacity. In 1652 she commanded the expedition sent to Orleans, forced her way into the city by one gate while the royalists were vainly seeking admission at another, and won over the authorities. She assisted Condé at the battle of the Porte St. Antoine, July 2d, by causing the royal troops to be fired on from the Bastille. Banished after the reestablishment of Louis XIV's authority in Paris, she employed her exile in the composition of her "Mémoires." She returned to Paris, 1660; in 1669 fell in love with Lauzun, and after his release from prison was secretly married to him. Lauzun soon behaved so badly that she forbade him her presence, and devoted the rest of her life to religion.

Montpensier, Antoine Marie Philippe Louis d'Orléans (Duc de), 1824-90; French prince; youngest son of King Louis Philippe; after serving in Algeria, married, 1846, the sister of Isabella II of Spain, an alliance which gave rise to serious complications; was made captain general of the Spanish army, 1858. In 1870 he was a candidate for the Spanish throne. The rival candidate, Don Enrique de Bourbon, brother of Isabella's husband, having disparaged him, was challenged by Montpensier, and killed. The duke was sentenced to one month's banishment and a fine of \$6,000. In 1871 he was exiled for refusing allegiance to King Amadeus, but soon returned to Madrid. His eldest daughter, Isabella, married the Comte de Paris, 1864.

Montreal (mōnt-rē-ā'), literally, Mount Royal, city in Province of Quebec, Canada, ranking first in the Dominion in population, wealth, commercial importance, and political influence; on the island of Montreal; formed at the junction of the Ottawa River with the St. Lawrence; 180 m. by water SW. of Quebec. It occupies a commanding position at the highest point of ocean navigation, and the beginning of a vast system of railways and canals that ramifies throughout Canada. The older part of the city lies at the base of a hill, whose crest, known as Mount Royal (a public park), is 799 ft. above the level of the river. There are many open squares scattered through the city, and the principal ones, such as Dominion Square, Victoria Square, Place Viger, and St. Louis Square, are adorned with ponds, fountains, and flowers. Mount Royal Park comprises nearly 500 acres. Farther E., on a high level ground, is Parc Lafontaine. The third park is on St. Helen's Island. The principal products manufactured are sugar, cotton, flour, malt liquors, tobacco and cigars, and iron and steel goods. The city is the chief distributing point for the commerce of the Do-

minion. It is the largest cheese market in the world, has an enormous trade in butter and other dairy products, and is the center of the grain-export trade of Canada, shipping great quantities of wheat and other cereals, flour and meal, lard, meats, etc. It contains the largest wholesale houses, the leading banks and other financial institutions, and the headquarters of the two great railway systems, the Canadian Pacific and the Grand Trunk. A government system, the Intercolonial Railway, connects the city with the Maritime Provinces. Situated at the head of ocean navigation in the summer season, and having Boston and Portland, St. John, New Brunswick, and Halifax, Nova Scotia, as winter ports when the St. Lawrence is closed, it holds the key to the commercial movement the year round. The St. Lawrence is crossed at this point by the Victoria Bridge, constructed, 1898-99, at a cost of \$20,000,000.

The site of the city was visited by Cartier, 1535, and named Mount Royal; was made a trading station by Champlain, 1614; was formally founded by Maisonneuve, 1642, and named Ville Marie de Montreal. It shortly became an important center of traffic in spite of the endeavors of the authorities at Quebec to prevent it. The early days of the city were full of warfare with the Indians, varied by more civilized but scarcely less bitter diplomatic strife between the religious and civil authorities at Montreal and Quebec. In 1741 the fortifications of the city, begun 1717, were completed. Nothing of these now remains, the growth of the city having long since compelled their demolition. It was to Montreal that Gov. de Vaudreuil retreated after Montcalm's defeat by Wolfe at Quebec, and there was signed the capitulation of New France. On September 7, 1760, the entry of the British troops marked the beginning of a new era. During the war between the N. American colonies and Great Britain (in 1775), Gen. Richard Montgomery, leader of a division of the Continental army, invaded Canada and captured Montreal. Since then, with the exception of the excitement connected with the rebellion of 1837, the history of the city has been that of ever-increasing growth and prosperity. Pop. 500,000.

Montrose, James Graham (first Marquis of), 1612-50; Scottish military officer; b. Montrose; joined the Covenanters, 1637; after some successes against the royalists, was won over to the king's side, 1639; was created a marquis, and, 1644, gathered an army of about 5,000 men, partly Irish mercenaries and partly Highlanders, who followed him from hatred of the Campbells. With this army he defeated the Covenanters several times with great slaughter, and took several towns; but, September 13, 1645, was defeated at Philiphaugh; in July, 1646, he capitulated at Middleton, and soon after left Scotland for the Continent. In March, 1650, he landed at the Orkneys with a small force in behalf of the exiled Charles II, but his army was scattered, and he himself taken prisoner, condemned to death as a traitor against the Covenant, and hanged at Edinburgh.

Monts (môn), Pierre du Guast (Sieur de), abt. 1560-1611; French explorer; b. Saintonge, France, of an Italian Catholic family; became a Protestant, and attached himself to the fortunes of Henry IV, by whom he was given a high post in the royal household; in 1603 was appointed director of the Canadian Company, to which was granted, under the name of Acadia, the region between lat. 40° and 46° N. De Monts fitted out a considerable expedition; sailed from Havre, 1604; explored the Bay of Fundy; discovered Annapolis harbor and the St. John River, which he ascended; visited the St. Lawrence, and returned to France in October, while his colony established itself at Port Royal (now Annapolis). On his arrival at court De Monts found his monopoly ended; various other grants were made to different individuals, and he failed to obtain indemnification. He dispatched Champlain and Pontgravé on a new voyage to the St. Lawrence, 1607; sent them other vessels, 1608, by the aid of which Quebec was founded. On the death of Henry, 1610, De Monts lost favor at court.

Montserrat (mönt-sér-rät'), island of the British W. Indies, forming part of the Leeward Islands colony; area, 32 sq. m.; pop. (1901) 12,215; is 34 m. NW. of Guadeloupe and 29 m. SE. of Nevis. Like most of the Caribbean Islands, Montserrat is mountainous and of volcanic origin. It has a crater, the Soufrière, which is now quiescent, though emitting fumes of sulphur. The principal products are sugar, rum, and tropical fruits. The only town is Plymouth. Montserrat was first colonized by the English, 1632, but was held by the French, 1664-68 and 1782-84.

Montserrat (mönt-sér-rät'), mountain in Catalonia, Spain, on the Llobregat River, 25 m. NW. of Barcelona; is about 24 m. in circumference, and its highest peak rises 4,057 ft. above the sea. The celebrated monastery, far up the E. side of the mountain, was suppressed, 1835, but some of the monks remained. Its numerous shrines and hermitages are annually visited by about 60,000 persons.

Montt (mönt), Jorge, 1847- ; Chilean naval officer and politician; son of Manuel Montt, statesman; b. Santiago; was a captain in the navy when, 1890, the Congress began its resistance to Pres. Balmaceda. When, January 6, 1891, the congressional leaders proclaimed a revolution, Montt was given provisional command of the naval and land forces. Soon after the death, by suicide, of Balmaceda, Montt was proclaimed provisional president, and was regularly elected to the office, November 6, 1891.

Montt, Manuel, 1809-80; Chilean statesman; b. Petorca; for a time was a professor in the National Institute, Santiago; but soon was appointed to government offices; entered actively into politics and became leader of the Conservatives; in 1841 was president of the Chamber of Deputies; 1841-45, Minister of Justice; 1846-48, Minister of the Interior. He was President of Chile, 1851-61, but the extreme Conservative policy of himself and his

principal minister Varas provoked a revolt, 1851, and civil war, 1858. Subsequently he was president of the Supreme Court.

Montyon (mān-tyāñ'), Antoine Jean Baptiste Robert Auger (Baron de), 1733-1820; French philanthropist; b. Paris; held high offices before the revolution, which drove him to England. Returning, 1815, he devoted his large fortune to philanthropic purposes, bequeathing to French hospitals over 3,000,000 fr. Every year the French Academy distributes two Montyon prizes on a foundation of 10,000 fr. each: one to the poor person who has performed the most meritorious deed of virtue, the other to the author of the work most conducive to the promotion of public morals. Two others of equal amount are awarded by the Academy of Sciences: one for some improvement in medicine or surgery, the other for the means of rendering some mechanical art less unhealthy.

Mon'ument, commemorative structure, as a building or column erected or a stone set up in memory of an important event or in honor of a famous man; by extension, any important building, perhaps in the sense that such a building commemorates the past. Monuments proper, that is, structures put up in memory of something or somebody, are of all sizes and kinds, from the small churchyard cross to the Great Pyramid. The last-named mass of stone is generally admitted to have served as a tomb at last if not at first, and the other pyramids of Egypt are tombs and nothing else. The great Sphinx, however, is a monument of a different kind, erected in honor of a divinity, or a system of worship and devotion. It is a human-headed lion, cut out of the living granite rock and of gigantic size, and is probably the oldest monument of which any considerable remains exist. The truly characteristic monument of modern times is the memorial chapel, the memorial hospital, the college hall, or the special library named after the man or the event commemorated. Such foundations as these, if they take on a decorative character in some part of the buildings which house them, are monuments in every sense of the word. They cannot, however, replace altogether the purely decorative structure, the colossal statue like Schwanthaler's "Bavaria" at Munich and Bartholdi's "Liberty" in New York harbor, the equestrian group, the pedestal crowned by a portrait statue, the emblematic or allegorical composition in sculpture.

Mon'za, town in province of Milan, Italy; on the Lambro; about 10 m. NNE. of Milan; is a favorite summer and autumn retreat; and is best known as the capital of the old Lombard kings, and especially as the favored seat of the renowned Theodolinda, who adorned it with magnificent buildings. In the cathedral is preserved the famous iron crown, so long used for the coronation of the kings of Lombardy. Pop. (1901) 33,685.

Moody, Dwight Lyman, 1837-99; American evangelist; b. Northfield, Mass.; worked on a farm till he was seventeen; joined a Congregational church, and, 1856, went to Chicago,

where he engaged in missionary work among the poor classes; and soon built up a Sunday school which numbered over 1,000 children. He was in the service of the Christian Commission during the Civil War, and subsequently became city missionary of the Young Men's Christian Association of Chicago; a church was built for his converts, and he became its unordained pastor. In 1873, accompanied by Ira D. Sankey, Moody went to Europe, and held religious revivals at Edinburgh, Glasgow, Dublin, London, and other cities of Great Britain; 1875, they returned to the U. S., and held large meetings in various cities. Moody afterwards continued his evangelistic labors in the U. S. and in Great Britain. He established four schools, three at his native town of Northfield, Mass., and one at Chicago.

Moon, satellite of the earth; nearest to us of the heavenly bodies; is a spheroid 2,161 m. in diameter (more than one fourth that of the earth), shining by reflecting the light of the sun. Its greatest distance from the earth's center is 252,600 m.; least distance from the earth's surface, 217,740 m.; density (that of

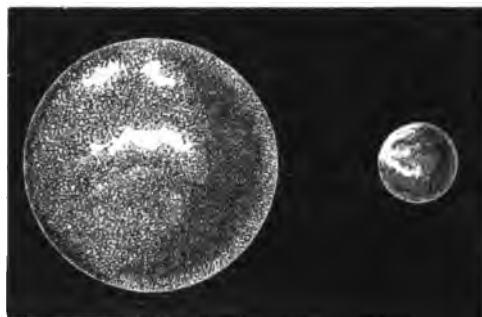


FIG. 1.—COMPARATIVE DIMENSIONS OF THE EARTH AND THE MOON.

the earth = 1) 0.605, gravity at the surface (earth = 1) 0.165. The moon revolves about the earth in 27.32 days, this being her mean sidereal revolution. To this motion are due her monthly phases. The course of these, however, is only completed in a lunar month, or synodical revolution, the mean length of which amounts to 29.53 days. For the phases depend on the moon's position with respect to the sun, which is constantly advancing in the direction of her motion; so that, after completing 360° of her orbit, she has the whole amount of the sun's monthly progress, an arc of about 29°, to pass over before she can complete her course of phases. The former period is sometimes called the sidereal month, the latter the synodic month. When not eclipsed, she always presents to the sun an illuminated hemisphere; her phases depend on the amount of that hemisphere turned toward the earth. The phases, in order, are known familiarly as new, crescent, half moon, gibbous, and full.

From the constancy of the physical features of the moon's disk, it is evident that she always presents to us the same hemisphere. To do this she must turn upon her axis precisely once while making one revolution in her orbit.

This appears to be the general law of the motions of the satellites; but it is not quite accurate to say that

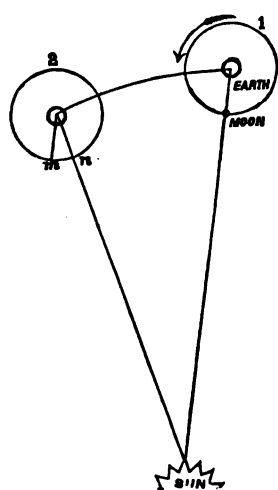


FIG. 2.—SIDEREAL AND SYNO-
DICAL REVOLUTIONS OF THE
MOON.

the moon constantly presents the same hemisphere to every observer upon the earth. Her axis of rotation being inclined one degree and a half to her orbit, and maintaining the same general direction in space as she moves round the earth, she appears to nod backward and forward in an arc of about 13° in the course of every revolution, exposing to view the regions just beyond her N. and S. poles alternately. Nor is this all. As the moon's orbit, like that of every other planetary body, is an ellipse, her orbital velocity is not uniform, being most rapid when she is nearest the earth. Thus she sometimes gets ahead of her mean place and sometimes lags behind it; and as her axial rotation is absolutely uniform, we are enabled to look over her edge, so to speak, now on the E. and now on the W. side. The arc through which she oscillates in this way amounts to more than 15° . Again, the constancy of the direction of her hither hemisphere is to be referred to the earth's center, so that the observer, situated on the extremity of the earth's radius, views her from an elevation of nearly 4,000 m.; and when she is in the horizon he can look over her elevated edge. The oscillation thus occasioned amounts to about 2° .

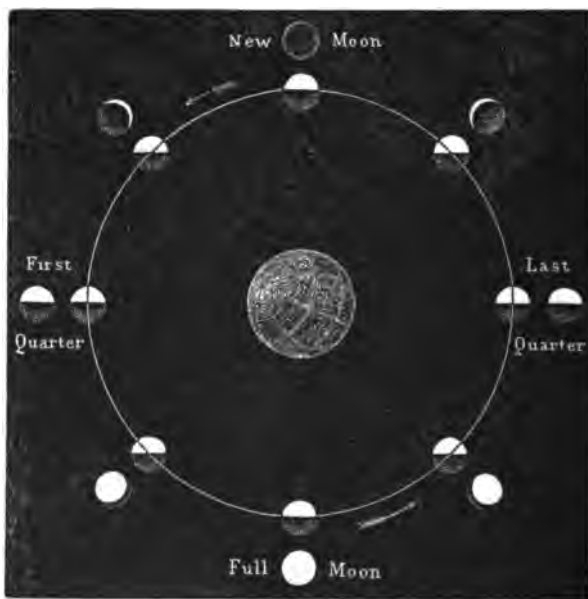
These exposures are called the moon's librations: the first her libration in latitude; the second her libration in longitude; the third her diurnal libration. The points where she crosses the ecliptic are known as her nodes; that at which she passes from the S. to the N. side of the line is called her ascending node, the other her descending node. The orbit of the moon being an ellipse, having the earth at one of its foci, her distance varies in different parts of her monthly course. The nearest point of her orbit is called perigee, the farthest apogee; the two are known as apsides. These points are not fixed, but move forward (on the whole) from W. to E., occupying successively every position in the circumference of the ellipse in the course of 8.8505 years.

These two remarkable motions, viz., of the nodes and of the apsides, are due to the disturbing action of the sun. The moon's surface has no obvious indications of water or of an atmosphere, although some observers believe they have detected slight evidences. The telescope reveals on the surface of the moon a scene of the wildest desolation—caverns thousands of feet in depth, and high mountains. Isolated peaks and volcanic craters here and there rise abruptly from extended plains to the height of 6,000 to 7,000 ft.

Moon, Mountains of the. See MOUNTAINS OF THE MOON.

Moon's stone, variety of adularia, or transparent potash feldspar (*orthoclase*); so called because when polished it presents an opalescent appearance due to internal pearly reflections. Varieties of *oligoclase* and *albite* (other species of feldspar) occasionally present a similar appearance. The finest moonstones come from the Kandy district in Ceylon.

Moore, Clement Clarke, 1779-1863; American scholar; b. New York; son of Bishop Benjamin Moore; in 1821 became Prof. of Biblical Learning in the Protestant Episcopal Seminary; afterwards Prof. of Hebrew and Greek, and then of Oriental and Greek Literature. Author of a "Hebrew and Greek Lexicon," a volume of poems, "George Castriot, surnamed Scanderbeg, King of Albania," and of the well-known ballad called "The Visit from St. Nicholas,"



ORBIT OF THE MOON, SHOWING THE LUNAR PHASES.

beginning: "Twas the night before Christmas, when all through the house."

Moore, Sir John, 1761-1809; British military officer; son of John Moore, M.D.; b. Glasgow, Scotland; entered the army, 1776; served in the Mediterranean, in America, and

the W. Indies, and sat in Parliament for a time; was Governor of St. Lucia, 1796-97; served in Ireland, 1798; in Egypt and became major general and K.B., 1801; in Sweden, 1802, as envoy and commander of the British contingent; took, 1808, chief command of the British troops in the Peninsula, managing the campaign against Napoleon with consummate skill and boldness; but the failure of the Spanish to coöperate with him compelled him to fall back on Corunna. He was killed at the battle of Corunna by a cannon shot. "The Burial of Sir John Moore," by Rev. Charles Wolfe, has immortalized both the subject and its author.

Moore, John Bassett, 1860- ; American publicist; b. Smyrna, Del.; admitted to the bar, 1883; Third Assistant Secretary of State, 1886-91; secretary for the U. S. in the Senate Conference, 1887, and in the Fisheries Conference, 1887-88; First Assistant Secretary of State, 1898; secretary and counsel to the U. S. Peace Commission at Paris, 1898; Prof. of International Law and Diplomacy in Columbia Univ. after 1891; author of "Report on Extraterritorial Crime," "Report on Extradition," "A Treatise on Extradition and Interstate Rendition," "Asylum in Legations and Consulates and in Vessels," "History and Digest of International Arbitrations," "American Diplomacy," is one of the editors of the *Journal du Droit International Privé*.

Moore, Thomas, 1779-1852; Irish poet; b. Dublin; published, 1800, his first volume of poems, the "Anacreon"; the "Poetical Works of Thomas Little," 1801, was vastly more popular, though marked by a vein of licentiousness which Moore lived to regret. He was in the civil service in the Bermudas, 1803-4; made the tour of the U. S. and Canada; married, 1811, Bessy Dyke, an actress of admirable character. For many years his principal writings were political satires in the Whig interest, full of wit and of general interest in their own day, but of small value now. His subsequent works of permanent value are the "Irish Melodies," "Lalla Rookh," "Loves of the Angels," "Life of Sheridan," "The Epicurean," a romance, "Life of Byron," and the "History of Ireland." He excelled as a song writer, and many of his songs set to favorite airs, such as "Araby's Daughter," "Those Evening Bells," "The Last Rose of Summer," etc., are still popular.

Moor Fowl, incorrectly RED GROUSE, ptarmigan of the British Islands (*Lagopus scoticus*), which is one of the most highly prized of British game birds. It is not only shot extensively by sportsmen, but it is snared for market, and even bred in confinement for food.

Moor Hen (*Gallinula chloropus*), bird of the rail family common in many parts of Europe, Asia, and Africa. It is about a foot long, of a dark-slate color, with a conspicuous red frontal shield formed by an upward prolongation of the beak. The moor hen swims well, and keeps time to the strokes of the feet with a nodding motion of the head. The nest is large, but usually hidden among the rushes, or placed at some distance from the edge of the water.

Moor'ish Architecture. See ARABIAN ARCHITECTURE.

Moors (Latin, MAURI; Spanish, MOROS), people of Mauritana or Morocco and adjoining parts. The Arabs who conquered Mauritania in the seventh century converted to Mohammedanism the native population, who called themselves Berbers, while by the Arabs they were termed Moghrebin, "men of the west." The Spaniards and Portuguese called the invaders of the Spanish peninsula Moors because they came from Mauritana, and the Spanish writers subsequently applied the term to all the Mohammedans of N. Africa. Many of the Moors emigrated to Africa on the fall of Granada, 1492. The remnant in Spain, named Moriscos, were finally completely expelled by Philip III, 1609.

The first, indeed the only, dynasty which swayed the whole of Spain and Portugal, with the exception of the Asturias, was that of the Omniade caliphs from 756 A.D. to 1036 A.D. This dynasty was founded by Abd-er-Ahman, who reigned thirty-four years. During his rule his capital, Cordova, was a center of learning—not for Arabs only, but for Christians. Abd-er-Ahman III, whose reign extended from 911 to 961 A.D., was probably, with the exceptions of Haroun-al-Raschid and Akbar of Delhi, the ablest ruler that has ever governed the followers of the Prophet. As a warrior he was pre-eminent, but as an administrator he was even greater. He was, too, the first of the Western rulers to adopt the title hitherto reserved for the caliphs of Bagdad alone, that of "commander of the faithful," and to rule his own dominions without reference to the original seat of Islam. Many of the works he executed still attest his power and munificence—notably, the great mosque at Cordova, with many roads, canals, aqueducts, and bridges. Many colleges and schools were also founded by him or by his son, Al-Hakem II, who, more perhaps than he, was an enthusiastic lover of literature, the great library he formed at Cordova being unrivaled at that period. See SARACENS.



MOORUK (*Casuarius bennetti*).

Moo'ruk, species of cassowary (*Casuarius bennetti*), differing from the cassowary of N.

Australia (*C. australis*) and related species in having the helmet-shaped crest of its head much less elevated and flattened behind. It is about 5 ft. high; is an inhabitant of the Australasian island of New Britain; is very easily tamed, and is often kept in a domesticated state by the natives who rear the birds from the egg. Like the ostrich, it swallows stones, iron, and whatever else it can pick up.

Moose. See DEER; ELK.

Moraes (mô-ris'), Prudente, abt. 1845-1902; Brazilian statesman; b. Itu, São Paulo; admitted to the bar, 1863; elected to the Provincial Assembly, 1866; the São Paulo Assembly, 1879; and the National Chamber of Deputies, 1885; first republican governor of São Paulo, 1889-90; then elected to the national Senate and its presidency; President of Brazil, 1894-98.

Moraine', (1) a mass of stones and earth carried by a glacier; (2) a mass of stones and earth deposited by a glacier.

Moralities. See MIRACLES AND MORALITIES.

Mor'al Philos'ophy. See ETHICS.

Moran', Edward, 1829-1901; American marine and genre painter; b. Bolton, England; came to the U. S., 1844; was an associate of the National Academy; member of the American Water-color Society and of the Pennsylvania Academy of Fine Arts; was well known as an etcher.

Moran, Thomas, 1837- ; American landscape painter; b. Bolton, England; pupil of his brother, the preceding; came to the U. S., 1844; National Academician, 1884; painted a large number of pictures of Rocky Mountain and other American scenery; "The Mountain of the Holy Cross" was one of his first great paintings; his "Grand Cañon of the Yellowstone" and "Chasm of the Colorado" are in the National Capitol. His wife, Mary Nimmo, was an accomplished etcher.

Moratin (mô-râ-tên'), Nicolas Fernandez de, 1737-80; Spanish poet; b. Madrid; became a lawyer and Prof. of Poetry in the Imperial College. Madrid; published a comedy, two tragedies, a narrative poem, etc.

Moratorium, strictly a period of delay; a legal provision adopted by various countries, states, cities, and large corporations at the outbreak of the World War to protect financial credits by extending the time of payments on obligations.

Mora'via, province of Austria; bounded W. by Bohemia, N. by Bohemia and Silesia, E. by Hungary and Silesia, and S. by Hungary and the duchy of Austria; area, 8,583 sq. m.; pop. (1900) 2,437,706. It is almost entirely encircled by mountains—W. by the Moravian, N. by the Sudetic, and E. by the Carpathian—whose branches and spurs intersect the province, with the exception of the S. part, which forms an elevated plain. The surface is traversed by the Morava (or March) and a number of minor streams, which all send their waters to the Danube. The more elevated portions of Mora-

via yield coal, alum, graphite, saltpeter, and metals, especially iron, copper, and lead; the valleys and S. plains afford excellent pasturage, and produce grain, potatoes, flax, hemp, hops, wine, chestnuts, and various kinds of fine fruits. Cattle, fine horses and sheep, geese, fowls, and bees are reared, and extensive manufactures of cotton, linen, silk, and woolen fabrics are carried on. In the twelfth century Moravia was made a margravate and declared a fief of the Bohemian crown, to be held by the younger sons; in 1526, on the death of Louis II at the battle of Mohacs, it fell to Austria, together with Bohemia, from which it was formally separated, 1849.

Mora'vian Church, The, ecclesiastical organization owing its distinctive name to the fact that in the fifteenth and sixteenth centuries Moravia constituted one of its principal seats, and because it was renewed in the eighteenth by refugees from that country. Its official name, however, is the Church of the United Brethren, or the Unitas Fratrum, and it originated not only in Moravia, but also in Bohemia. The blood of the martyr Huss was its seed. It was founded by some of his followers, 1457, in the barony of Lititz, Bohemia, on the following principles: The Bible is the only source of Christian doctrine; public worship is to be conducted in accordance with the teaching of the Scriptures and on the model of the Apostolic Church; the Lord's Supper is to be received in faith, to be doctrinally defined in the language of the Bible, and every human explanation of that language is to be avoided. Its first ministers were priests of the Calixtine or National Church, from which the Brethren had seceded. In 1467, however, they introduced a ministry of their own, and secured the episcopacy from Bishop Steven of the Austrian Waldenses. In 1557 the Unitas Fratrum was divided into three ecclesiastical provinces—the Bohemian, the Moravian, and the Polish—each governed by bishops of its own, but all united as one church. In the early part of the Thirty Years' War Ferdinand II inaugurated the so-called Counter-reformation, which crushed evangelical religion out of Bohemia and Moravia, and the majority of its members were driven into exile, 1620.

A new center was established at Lissa, Poland, but Lissa was destroyed, 1656, in a war between Poland and Sweden, and the remaining parishes were gradually absorbed by other Protestant bodies. For more than half a century the Unitas Fratrum ceased to exist as a visible organization. Its hidden seed in Bohemia and Moravia, however, remained, and its illustrious bishop, Amos Comenius, commended the future Church of the Brethren to the care of the Church of England, and took steps to perpetuate its episcopacy. Hence, for a period of fifty years, clergymen of the Reformed Church were consecrated bishops of the Unitas Fratrum, that the succession might not die out. On June 17, 1722, a few descendants of the Brethren, who had fled from their native land to Saxony, began to build the town of Herrnhut on an estate of Count Zinzendorf, where an asylum had been provided for them. This town soon became the rallying place for the remnant of the church. Count Zinzendorf himself became the leading

bishop of the resuscitated church, and he strove to build it up in such a way as not to interfere with the rights and privileges of the state church. In carrying out this principle he did not let the renewed *Unitas Fratrum* expand as other churches expand, but established on the continent of Europe, in Great Britain, and in America exclusively Moravian settlements, in which was fostered the highest type of spiritual life.

The *Unitas Fratrum* now consists of three provinces—the German, British, and American—which are independent in all provincial affairs, but form one organic whole in regard to the fundamental principles of doctrine, discipline, and ritual, as also in carrying on the foreign and the Bohemian missions. Hence there is a provincial and a general government. Each province has a provincial synod, which elects from time to time a board of bishops and other clergymen, styled “Provincial Elders’ Conference,” to administer the government in the interval between synods. Every ten or twelve years a general synod of the whole *Unitas Fratrum* is convened at Herrnhut, in Saxony. It consists of delegates from each province and from the foreign missions, and elects a board of twelve bishops and other clergymen, styled the “Unity’s Elders’ Conference,” which oversees the whole church and superintends the foreign and Bohemian missions. The distinguishing feature of Moravian theology is the prominence given to the person and work of Christ, and a marked characteristic of the Church generally is its catholicity. The ministry consists of bishops, presbyters, and deacons. The episcopal office is not provincial and not diocesan, but represents the whole *Unitas Fratrum*.

Moray (mūr’I), James Stuart. See MURRAY, JAMES STUART.

Moray (mūr’ā) Firth, inlet of the German Ocean, on the NE. coast of Scotland, 16 m. wide at the entrance, and stretching inland for about 39 m., to the mouth of the Beaulieu River.

Morazan (mō-rā-sān’), Francisco, 1792–1842; Central American statesman; b. Tegucigalpa, Honduras. During the revolt of Honduras and Salvador against the arbitrary and unconstitutional acts of Arce, President of Central America, he became a military leader; gained Honduras for the Liberals; took the capital of Guatemala (and of Central America), 1829; assumed the executive, proceeded to restore the constitution, and called a congress. Elected President of Central America, 1830, he governed wisely in the main, but revolts incited by the reactionist and church parties broke out, and, though reëlected, 1834, he could not maintain order. No provision having been made for electing his successor, the Central American Confederation was, *ipso facto*, dissolved. Supported by Salvador, Morazan attempted to preserve the union by force; was defeated by Carrera, 1840, and fled to Peru. In 1842 he landed in Costa Rica and again proclaimed the confederation; Carillo, President of Costa Rica, was deposed and Morazan assumed the presidency. A counter revolution caused his deposition, and he was captured soon after and shot.

Mordants, substances used in dyeing and calico printing to fix colors which have no affinity for the tissues; in gilding, any viscous or sticky matter employed in making gold leaf adhere. Animal fibers, as silk and wool, generally attract coloring matters; for them, therefore, mordants are less important, though they are often used, either to make the color more durable or to brighten or otherwise modify the tint. Few colors can, however, be made to adhere to vegetable fibers, cotton or linen, without the aid of a mordant. Colors which require mordants are called adjective; those which do not, substantive. Safflower is a substantive dye for cotton and linen; most other dyes are adjective for these fibers. The mordant has a positive affinity for both color and fiber, and binds the two together. The most important mordants are soluble salts of aluminum, iron, and tin.

More, Hannah, 1745–1833; English author; b. Stapleton, Gloucestershire; began writing poems, pastorals, romantic tales, and tragedies at an early age; made the acquaintance of Garrick, by whom her tragedies of “Percy,” 1778, and “The Fatal Secret” were successfully produced at Covent Garden; abandoned writing for the stage from religious scruples while in the height of success, and devoted her pen to the advancement of religion and education. She settled at Wrington, 1786; produced “Sacred Dramas,” “Florio,” “Thoughts on the Manners of the Great,” and “Religion of the Fashionable World”; established at Bath *The Cheap Repository*, 1795, a monthly periodical, in which she published the celebrated “Shepherd of Salisbury Plain”; acquired a competence by her writings and the management of her seminary; removed to Barley Wood, near Cheddart, 1802, where she founded several charitable schools; published “Strictures on the Modern System of Female Education,” “Celebs in Search of a Wife,” her most popular book; “Practical Piety,” and numerous other works; settled at Clifton, 1828, and died there.

More, Sir Thomas, 1478–1535; English statesman; b. London; son of Sir Thomas More, Judge of the King’s Bench; when fifteen years old became a member of the family of Cardinal Marton, Archbishop of Canterbury; studied law; was elected to Parliament, 1504; opposed the exactions of Henry VII before the courts and in Parliament. Henry VIII made him confidential envoy to the Netherlands, 1514 and 1515, to negotiate for the enlargement of commercial privileges. About this time he composed in Latin his most famous work the “Utopia,” or account of an imaginary commonwealth in a distant island of the Atlantic, of which the manners, laws, and state of society were depicted as a model worthy of English imitation. More was made privy counselor and treasurer of the Exchequer; knighted, 1521; repeatedly sent by Wolsey on special commissions to France; chosen Speaker of the House of Commons, 1523; accompanied Wolsey on his famous embassy to France, 1527; and became Lord Chancellor, 1529. His refusal to countenance the proceedings for divorce begun by Henry VIII against Catharine of Aragon led to his retirement from

the chancellorship, 1532. He thenceforth lived in seclusion at Chelsea; but in April, 1534, he was committed to the Tower for refusing to swear allegiance to the "act of succession," which excluded the daughter of Queen Catharine from the throne in favor of the offspring of Anne Boleyn. He refused to take the oath of submission to the king in his newly assumed character of head of the Church; was brought to trial before the High Commission for constructive treason; condemned to death, and executed within the Tower, July 6th.

Morea (mō-rē'ā). See PELOPONNESUS.

Morea'le. See FRA MOREALE.

Moreau (mō-rō'), Jean Victor, 1761-1813; French general; b. Morlaix; became a general of division under Pichegru, 1794; served in Holland; commanded the Army of the Rhine and Moselle, 1796; penetrated into the center of Bavaria, driving the Austrians under Archduke Charles before him; by Jourdan's defeat at Würzburg was compelled to retreat while fighting a superior army; distinguished himself as commander in Italy, 1799; appointed commander of a new Army of the Rhine, 1800; gained a decisive victory over the Austrians at Hohenlinden (December 3d), which resulted in the Peace of Lunéville. Subsequently he was charged with conspiracy against Napoleon, imprisoned, and exiled; lived near Trenton, N. J., 1805-13; entered the Russian service; and was mortally wounded in the battle of Dresden, August 27, 1813.

Morel, fungi of the genus *Morchella*, best known for their esculent qualities, being among those fungi which were first used as food. The best known species of the genus is *M. esculenta*, which inhabits woody and bushy places, growing chiefly in the spring. The common morel is found in the U. S., as well as in most parts of Europe, but those in commerce come mostly from Germany.



COMMON MOREL,
NATURAL SIZE.

More'los, state of Mexico; surrounded by Mexico, Puebla, and Guerrero; area, 2,773 sq. m.; pop. (1900) 160,115; capital, Cuernavaca; sugar cane is extensively cultivated, and sugar and rum are the chief exports.

Morelos y Pavon (mō-rā'los ē pā-vōn'), José Maria, 1765-1815; Mexican patriot; b. near Apatzingan, Michoacan; entered the priesthood and held curacies near Valladolid; joined, 1810, the revolt proclaimed by Hidalgo; after the latter's defeat, formed a new center of resistance in the S., and repeatedly defeated small Spanish forces; finally had under him 5,500 men. Fortifying himself at Cuautla, 1812, he was besieged for sixty-two days, but in the end escaped with a great part of his forces, and won victory after victory; 1813, he called a patriot congress,

which made him captain general, declared the abolition of slavery, and put forth a declaration of independence. An attempt to take Valladolid, 1814, was defeated by Iturbide (afterwards emperor); Morelos suffered reverses, and, 1815, was captured, taken to Mexico City, forced to do penance before the Inquisition, and shot.

Mor'gan, Daniel, 1736-1802; American soldier; b. Hunterdon Co., N. J.; was a farmer in Virginia until the outbreak of the Revolution, when he went to Boston in command of a company of riflemen. In December, 1775, he accompanied Arnold to Quebec, and was a prisoner till the close of 1776. As colonel of a rifle regiment he rendered valuable services in New Jersey, 1776-77. After joining Gates, his riflemen took a distinguished part in the battle of Bemus Heights. In 1780 he was made brigadier general and transferred to the Southern army. He gained a decisive victory over Tarleton at the Cowpens, January 17, 1781, for which he received a gold medal from Congress. He was a member of Congress, 1795-99.

Morgan, Sir Henry, abt. 1637-90; British buccaneer; b. Wales; for many years maintained his position among the W. India islands as chief of a host of pirates. The most daring of his expeditions was that in which, sailing from Jamaica, 1670, he captured and sacked Portobello and Panama. He afterwards settled in Jamaica, where he was made a marine commissary and knighted.

Morgan, John Hunt, 1826-64; American military officer; b. Huntsville, Ala.; served in a cavalry regiment in the Mexican War; became a manufacturer at Lexington, Ky., where, 1861, he organized the Lexington Rifles, with whom he joined Gen. Buckner in the Confederate service; commanded a squadron of cavalry at Shiloh; and soon after began a series of raids through the portions of Kentucky held by the Union forces, destroying railways, bridges, and supplies, and gaining a wide celebrity. In 1862 he was promoted to major general. In 1863 he crossed the Ohio River on a raid, but was captured with most of his command, and was confined in the Ohio Penitentiary. He escaped, and again undertook a raid in Tennessee, but was surprised during the night by Federal cavalry near Greenville and killed.

Morgan, Lady Sydney Owenson, abt. 1780-1859; Irish author; b. Dublin; daughter of an actor; earlier works include a volume of poems, "The Wild Irish Girl," a popular novel; "Patriotic Sketches of Ireland," "Woman, or Ida of Athens," and "The Missionary." In 1812 she married Sir Thomas Charles Morgan, with whom she traveled and resided on the Continent, publishing a review of the social state of France, and a similar work on Italy. Among her other works are her novels, "O'Donnell," "Florence Macarthy," "The Life and Times of Salvator Rosa," "The O'Briens and the O'Flahertys," "Book of the Boudoir," "Dramatic Scenes from Real Life," "The Princess, or the Béguine," "Woman and Her Master," and "Passages from My Autobiography."

Morganat'ic Marriage, marriage between a man of noble birth and a woman of inferior station or rank, by the terms of which neither the woman nor her children have any right to the titles, arms, or dignity of the husband, nor any right to succeed to his estate except as provided by contract. These restrictions affect only the rank and property rights of the parties concerned, and do not affect the validity of the marriage, which in general is regularly celebrated, and the children of such a marriage are legitimate. The term left-handed marriage arose from the old custom that the children of such a marriage should follow on the inferior, that is, the left, hand.

Morgar'ten, hill in Switzerland, near Rothenthurm, on the E. border of the canton of Zug, where 1,400 undisciplined and ill-armed mountaineers from Schwytz, Uri, and Unterwalden overwhelmed, November 16, 1315, 20,000 Austrians under Duke Leopold. This was the first victory gained by the Swiss in their struggle for freedom.

Mor'ghen, **Raffaello Sanzio**, 1758-1833; Italian engraver; b. Florence; married, 1781, the only daughter of his teacher, Volpato, in Rome, and, 1793, opened a school of engraving in Florence. His most meritorious work is his print of the "Last Supper" after Leonardo da Vinci, and the most elaborate that of the "Transfiguration" of Raphael. He engraved in all 201 plates, including seventy-three portraits.

Morgue, place for the exhibition of dead bodies of unknown persons, with a view to their identification. Such establishments existed in Paris as early as the seventeenth century in connection with prisons. The one in the Châtelet was succeeded, 1804, by a separate establishment, which was enlarged, 1830; but this proving inadequate, another was opened, 1866, close by the Seine, behind the Cathedral of Notre Dame. The dead are placed inside a glazed partition, on slabs of marble, and means are employed to delay decomposition. The greater number of the bodies are recognized. The morgue in New York was established 1866. It is on the grounds of Bellevue Hospital. As soon as a corpse is brought in, a full account of its recovery, when and where found, a description, and other particulars are recorded. Recognized bodies, by permission of the coroner, are removed by friends; those unrecognized are exposed on marble slabs. Photographs are taken for the inspection of persons in search of missing friends. The clothing is exhibited thirty days and kept a year. Morgues in other cities are in general patterned after these types.

Mori (mō'rē), **Arinori** (Viscount), 1848-89; Japanese scholar and statesman; b. province of Satsuma. Appointed to a legal post, he early associated himself with educational matters as a commissioner of schools. When *chargé d'affaires* in Washington he arranged the postal convention with the U. S. He afterwards served as minister at Peking and London. He returned to Japan with distinct educational

views, and was given the portfolio of education, 1885, which he held until his death.

Mori'ah, Mt. See JERUSALEM.

Mörrike (mō'ri-kē), **Eduard**, 1804-75; German poet; b. Ludwigsburg; was a pastor, and afterwards Prof. of Literature in Stuttgart, 1866; was one of the best of the Suabian poets, made excellent translations of Anacreon and Theocritus, and wrote stories, novels, and an opera, "Die Regenbrüder."

Morillo (mō-rē'l'yō), **Pablo**, 1777-1838; Spanish military officer; b. Fuente de Malva; during the French invasion, 1808-9, was a noted guerrilla chief in Murcia; joined the regular army, 1809; was made general of division, 1814, and given command of 10,600 men (subsequently reinforced) to put down the rebellion in the N. part of S. America. He took Cartagena, Colombia, 1815, and Bogotá, 1816, in the latter town executing 125 prominent citizens, and for his successes was created Count of Cartagena, with the title of Pacifcator. A victory over a part of his forces having been obtained by Bolivar, Morillo was forced to sign an armistice, 1820, and soon after was relieved, at his own request. He subsequently held high commands in Spain and was created Marquis of Fuentes, but on account of his vacillation in political matters was degraded by the king, 1823, and retired to France.

Mor'laks, division of the Slavic population of Dalmatia and the adjoining maritime districts of Austria-Hungary. They form a large portion of the sailors in the Austrian navy.

Morley, **Henry**, 1822-94; English author; b. London; practiced medicine, 1844-48; became, 1851, a London journalist, and afterwards edited *The Examiner*; was lecturer on English Literature at King's College, London, 1857-65; Prof. of English Language and Literature at University College, London, 1865-89; Examiner in English Language, Literature, and History at the Univ. of London, 1870-75 and 1878-83; held the same post at Queen's College, London, 1878-89; and was principal of University Hall, London. Author of "How to Make Home Unhealthy," "Defense of Ignorance," "Lives" of Palissy, Cardan, Cornelius Agrippa, Marot, etc.; "English Writers," "Tables of English Literature," "A First Sketch of English Literature," "English Literature in the Reign of Victoria"; edited many series, as "The Library of English Literature," "Morley's Universal Library" (begun 1884), "Cassell's National Library" (begun 1886), etc.

Morley, **John**, 1838- ; English author and statesman; b. Blackburn, Lancashire; admitted to the bar, 1873; editor for some years of *The Literary Gazette*, of *The Fortnightly Review*, 1867-82; of *The Pall Mall Gazette*, 1880-83; and of *Macmillan's Magazine*, 1883-85; editor of the biographies known as the "English Men of Letters Series," and author of "On Compromise," "The Struggle for National Education," and of many noteworthy critical and biographical studies, including

"Edmund Burke," "Critical Miscellanies," "Voltaire," "Rousseau," "Diderot and the Encyclopædists," "Cobden," "Emerson," "Walpole," and "Cromwell." In 1883 he was elected to Parliament; was an advanced Liberal in politics and an advocate of Home Rule; Chief Secretary for Ireland, 1886 and 1892-95; appointed Secretary of State for India, 1905; created Viscount, 1908.

Morley, Thomas, abt. 1545-1604; English composer; imitated the Italian style; was a skillful performer and a prolific composer of anthems, church services, ballets, canzonets, and madrigals. He published four books of "Madrigals," "A Plaine and Easie Introduction to Practicall Musicke," and "The Triumphs of Oriana," a collection of twenty-four madrigals in honor of Queen Elizabeth (Oriana) by as many English verse writers. One of the writers was John Milton, father of the poet.

Mor'mon, Book of, compilation esteemed by the Mormons as a divine work. According to the account by Joseph Smith, September 22, 1827, when he was residing in W. New York, the angel of the Lord placed in his hands certain golden plates and the Urim and Thummim, which were two transparent stones in silver bows. From these plates Smith read off, with the aid of the stone spectacles, the "Book of Mormon," or Golden Bible as he sometimes called it, to Oliver Cowdery, who wrote it down as Smith read it; and it was printed, 1830, in a volume of several hundred pages. It is a verbose imitation of the common English translation of the Bible, portions of which, to the number in all of 300 passages, are incorporated without acknowledgment. The first book professes to be the work of Nephi, a Jew, the son of Lehi, who dwelt at Jerusalem in the days of King Zedekiah, abt. 600 B.C. In obedience to the command of the Lord, Lehi and his family set out in search of a promised land, and after traveling "nearly eastward" for many years, "through a wilderness," they reached the ocean, built a ship, and, guided by a compass, landed in America.

Soon after Lehi died, his youngest son Nephi being divinely appointed his successor. Dissensions ensued between Nephi and his elder brothers, Laman and Lemuel. The latter were cursed by the Lord, and they and all their posterity were condemned to have dark skins. This was the origin of the American Indians. The Nephites were governed by kings bearing the name of Nephi for many generations. A terrible earthquake announced the crucifixion of Christ at Jerusalem, and three days afterwards the Lord Himself descended out of heaven into the chief city of the Nephites. The Nephites accepted Christianity, but were finally, 384 A.D., overwhelmed by the heathen Lamanites, on the hill Cumorah, in W. New York. Moroni, one of the survivors, sealed up the golden plates on which all these things were written, and hid them in the hill where they were found by Joseph Smith. According to the opponents of Mormonism, from investigations made soon after the appearance of the "Book of Mormon" the fact is established

that the real author of the work was Solomon Spalding, who was born in Ashford, Conn., 1761; graduated at Dartmouth College, 1785; was ordained, preached for three or four years, afterwards engaged in mercantile business, and died at Amity, Pa., 1816.

His widow published a statement in the Boston Journal, May 18, 1839, declaring that, 1812, he placed the manuscript of a romance in a printing office at Pittsburg with which Sidney Rigdon was connected. Rigdon, she says, copied the manuscript, which subsequently was returned to the author. His widow preserved it till after the publication of the "Book of Mormon," with which it was publicly compared. Sidney Rigdon was born in St. Clair township, Allegheny Co., Pa., February 19, 1793. Soon after getting possession of a copy of Spalding's manuscript, he quitted the printing office and became a preacher of doctrines similar to those afterwards incorporated into the "Book of Mormon." He had a small body of converts, when, abt. 1829, he became associated with Joseph Smith. Smith and Rigdon were both inclined to teach millenarianism, and they accordingly settled it that the millennium was close at hand, and that America was to be the final gathering place of the saints. With the "Book of Mormon" as their text and authority, they began to preach this new gospel; and Smith's family and a few of his associates, together with some of Rigdon's previous followers, were soon numerous enough to constitute the Mormon Church.

Mor'mons, or, as they call themselves, the CHURCH OF JESUS CHRIST OF LATER-DAY SAINTS, religious sect founded at Fayette, N. Y., April 6, 1830, by Joseph Smith. The hostility of his neighbors caused Smith to lead his followers to Kirkland, Ohio, 1831, and there a temple was built, and the sect increased in numbers and wealth through the efforts of missionaries sent out by the prophet. Popular animosity forced another removal, and, 1838, the majority of the saints rallied at Far West, Mo. Here open war between them and the people broke out, and the Mormons settled near Commerce, Ill., where they built the city of Nauvoo, and at once became an important factor in the commerce and politics of the state. An extraordinary charter was granted to the city, which made the corporation almost independent of the state government, and gave to Smith civil and military authority within the city nearly equal to the religious power which he exercised over his people. Nauvoo flourished wonderfully and the Church gained in membership, proselytes gathering from New England and the Middle States and from Europe. Here, however, the popular enmity was as keen or even more bitter than it had been elsewhere. Dissensions also arose within the ranks of the saints themselves. There was a clashing of authority between the state and the city. Finally, 1844, Smith was charged with treason against the state, and was put in jail, where he and his brother Hyrum were killed by a mob which had broken in. The Church, however, continued to grow rapidly.

Brigham Young, an organizer and leader,

and a man actuated by ambition, had joined the Church, 1832, and at the time of Smith's assassination was at the head of the Quorum of Apostles. He at once assumed the leadership; in 1845 there was a general removal, temporary headquarters being set up at Council Bluffs, Iowa, and, July 24, 1847, Young, with an advance party, arrived in the Salt Lake Valley of Utah, which he proclaimed the sought-for land. Salt Lake City was founded, and since then has been the headquarters and the gathering place of the saints, their Zion. That is the "center stake," as they term it, but by direction of the leaders Mormons have gone into the surrounding states, and they now form a considerable percentage of the population of Idaho, Wyoming, Colorado, Arizona, and Nevada, while they have large colonies in Old Mexico, and missions in various parts of Europe, Asia, Australia, and the Pacific islands. In the U. S. they had (1908) 1,952 ministers, 1,328 churches, and 398,000 communicants. Statistics for the world (1906) showed 55 stakes, 22 missions, 1,500 missionaries, 3,662 officers, and 400,000 souls.

The Mormons are Trinitarians. They hold that men will be punished for their own sins and not for Adam's transgression, and that through the atonement of Christ mankind may be saved by obedience to the laws and ordinances of the Gospel, those ordinances being: first, faith in the Lord Jesus Christ; second, repentance; third, baptism for the remission of sins; fourth, laying on of hands for the gift of the Holy Ghost. They also believe that a man must be called of God to preach the Gospel; in a Church organization comprising apostles, prophets, pastors, teachers, evangelists, etc.; in the gifts of tongues, prophecy, revelation, visions, healing, etc.; in the Bible as the word of God, "as far as it is translated correctly," and in the "Book of Mormon" as the further word of God; in the literal gathering of Israel and the restoration of the Ten Tribes; in the building of Zion on the American continent; and in the coming of Christ to reign in person. The Church organization is a theocracy, pure and simple, the officers forming a complete priesthood. The supreme authority is vested in the First Presidency, comprising the president, who is also designated prophet, seer, and revelator, and two counselors, all being chosen by the body of the Church. Then follow the apostles, of whom there are twelve; the patriarch, seventies, high priests, elders, bishops, priests, teachers, and deacons. A distinguishing characteristic is belief in continuous divine revelation, and all are entitled to such revelation, but only the communications from the Lord which come through the prophet president are authoritative and necessarily binding on the Church.

The first president was Joseph Smith, Jr.; his counselors, the three comprising the original First Presidency, were Sidney Rigdon and Frederick G. Williams. The first patriarch was Joseph Smith, Sr., father of the founder of the Church. Joseph Smith's successors have been Brigham Young, chosen, 1847; John Taylor, elected, 1880; Wilford Woodruff, chosen, 1887; Lorenzo Snow, chosen, 1898; and Joseph

F. Smith, a nephew of the prophet, chosen, 1901. Polygamy was not publicly preached until the saints were settled in Utah, but it has been proven that Smith had several wives, as did a number of the leading Mormons of his time. After 1852 it was both preached and practiced. As early as 1862 the Federal Government undertook to stamp out the practice, a law forbidding it being enacted in that year. In 1882 a severer statute was enacted, and, 1887, Congress disincorporated the Mormon Church and confiscated its immense property in excess of \$50,000. The Emigration Company, an extensive transportation association which managed the immigration business of the Church, was also disincorporated, and its resources were taken possession of by the Government. The Mormons resisted this law also without success.

After hundreds had endured imprisonment and millions of dollars had been spent in payment of fines, feeing lawyers, and so on, and the vast property holdings of the Church had been lost, finally, in September, 1890, Pres. Woodruff issued a pronunciamento against polygamous marriages. His action was approved by the body of the Church in general conference in the following October, and since that time plural marriages have not been sanctioned by the Church. In 1905 more than 2,000,000 women of the U. S. signed a memorial for the unseating of Reed Smoot, a U. S. Senator from Utah, for his adhesion to Mormonism, and in testimony taken by a special committee of the Senate, 1905-6, many of the inner practices of the Church were revealed.

Morn'ing-glory Fam'ly, the *Convolvulaceæ*, a group of dicotyledonous plants, mostly twining or trailing herbs, with alternate leaves, gamopetalous flowers, and a superior two- or



SECTION OF MORNING GLORY.

three-celled ovary. The 870 species are distributed widely throughout the globe, about 100 being natives of the U. S. Many species are favorite ornamental plants, as the morning glories (species of *Ipomœa*), bindweeds (species of *Convolvulus*), etc. The sweet potato (*I. batatas*), originally of India, has long

been cultivated in warm and temperate climates for its nutritious roots. The parasitic doddars number about eighty species of the genus *Cuscuta*.

Morny (môr-nô'), Charles Auguste Louis Joseph (Duc de), 1811-65; French soldier and politician; b. Paris; son of Queen Hortense of Holland and Count de Flahault, and half brother of Napoleon III. His birth was kept a secret, however, and he was adopted by a Count de Morny, of Mauritius. He entered the army, fought with distinction in Algeria, and was made a chevalier of the Legion of Honor. Queen Hortense having died, 1837, and left him an annuity, he returned to Paris, and divided his time and energy equally between dissipation and financial speculation. As Minister of the Interior he was the executor, and probably also the instigator, of the *coup d'état*; and though he soon retired from the cabinet and contented himself with the chair of president of the Corps Législatif, he continued to exercise a considerable influence on the emperor.

Morocco, sultanate of NW. Africa; bounded by Algeria, the Mediterranean, the Strait of Gibraltar, the Atlantic, and the Sahara; area estimated at 219,000 sq. m.; pop. abt. 5,000,000; capitals, Fez and Morocco. The coast along the Atlantic is generally low, flat, sandy, and affords only a few harbors—El-Araish, Rabata, Casablanca, Mazagan, Safi, and Mogador, while from the Strait of Gibraltar E. along the Mediterranean it is high, bold, and rocky. The principal harbors here are Tangier, on the Strait of Gibraltar, and Tetuan. Spain owns Ceuta and several other points on this coast. A beautiful and very fertile plain, containing all the large cities, Morocco, Fez, etc., extends between the Coast Range and the Atlas Mountains, which in several parallel lines traverse the country from NE. to SW. Miltzin, the highest point of the Atlas, 30 m. SE. of the city of Morocco, rises to a height of 11,500 ft., but is often entirely free from snow. A number of rivers originate in the Atlas—the Draa, Sus, and several smaller rivers flowing to the Atlantic and the Mulua to the Mediterranean—but none of them is navigable. Excellent marbles of different kinds are found; gold, silver, copper, tin, nickel, rock salt, and sulphur occur; iron is abundant and of good quality. In the valleys and the plain all the cereals, fruits, and vegetables of the warm and temperate zones can be cultivated, but agriculture is generally in a very backward state. Large herds of cattle, horses of a small but spirited breed, goats whose skins furnish the famous morocco leather, and camels are reared. Manufactures of fine woollens and silks are carried on at Fez, one of the capitals, and of bricks and silver ware in other places; the fez, a well-known red cloth cap, takes its name from this city. The only branch of industry extensively developed is that of leather. The commerce is inconsiderable; the traffic with the S. and E. countries is carried on by caravans.

The inhabitants are Berbers (generally agriculturists), Arabs (nomadic Bedouins), Moors, Jews, and Negroes. The government has very

indifferent control over the mountain tribes, particularly those among the Er-Rif Mountains in the N., who are chiefly Berbers. The languages spoken are dialects more or less corrupted of the Berber, Arabic, Spanish, and Negro tongues from the interior of Africa. The reigning religion is Islam. In ancient times the country formed part of Mauritania (q.v.); in the seventh century it was conquered by the Arabs, whose religion and customs the Moors adopted. In 787 the Kingdom of Fez was founded; 1058, that of Morocco. In 1648 the present dynasty ascended the throne. In 1814 slavery of Christians was prohibited, and, 1817, piracy was suppressed. Insurrections against the authority of the sultan having brought the country to a state of anarchy, the great powers interested found it necessary to come to an understanding regarding their respective rights, and a conference was held at Algeciras, 1906, Morocco being represented. Under the agreement there negotiated, a state bank was established and a Moorish police force organized. In 1911 Germany violated the Algeciras agreement by landing troops at Agadir, and war was narrowly averted. Germany was forced to sign a treaty guaranteeing complete freedom in Morocco to France.

Morocco, S. capital of Morocco; in a plain at the foot of the Atlas, 1,500 ft. above the level of the sea; is surrounded by a wall 23 ft. high, 7½ m. in circuit, generally in a dilapidated condition. The city was founded, 1072, and was in the thirteenth and fourteenth centuries a famous seat of learning, and is said to have contained 700,000 inhabitants. It has still many large mosques and a magnificent palace, otherwise its splendor has decayed. Of its manufactures, that of red and yellow morocco is famous; its commerce is chiefly carried on by Jews. Pop. abt. 50,000.

Morocco Leather, name originally given to leather made from goatskins tanned with sumach, but now applied also to the inferior sort (roan) made from sheepskins. The name appears to be derived from the superior excellence of the leather formerly obtained from Morocco. Morocco leather is considered to be the best material for bookbinding, and the estimation in which it is held has led to extensive counterfeiting, inferior sheepskins being dressed and dyed to resemble it as much as possible. The preparation of imitation morocco from sheepskin does not vary greatly from that used for the genuine article. The color of the leather is not always given by dyeing, as almost any hue can be obtained by topical application.

Morpheus, god of sleep, son of Somnus. The name is first found in Ovid.

Morphia, or **Morphine**. See **OPTUM**.

Morphology, that branch of science which treats of the general form and organization of animals and plants, and the principles involved in their structures. It relates to the nature and origin of structures and organs, but has no reference to the uses or functions of parts. Morphological problems have been classified

under (1) anatomy (divided into tectology and promorphology) and (2) morphogeny (including ontogeny or embryology and phylogeny). Haeckel defines these divisions as follows: *Anatomy* is morphology in the narrowest sense, and treats of the entire structure of the organism. *Tectology* is that science which treats of the composition of the organism from organic elements or entities of different degrees. *Promorphology* is that science which treats of the superficial form of organic individuals, or their stereometric fundamental form. *Morphogeny* is the general science of the developing form of the organism. *Ontogeny* is the developmental history of the organic individuals. *Phylogeny* is the developmental history of organic stems or genealogical stocks. The necessity for exact expression has also given rise to a number of terms of which only those most generally used need be referred to. *Homological* parts are those which agree in structural relations, however much they may differ in functions. *Analogous* parts are those which agree in function, however much they may differ in structure, and may be (but not necessarily) modified from entirely different primitive elements. *Metameria*, or serially homological parts, are those which agree in general characters and relations, and are developed in an analogous manner, but not from the identically corresponding elements.

In plant life morphology begins with the cell, whose identity is recognized whatever changes of form and function it undergoes. Modern botany recognizes the fact that every cell is an organism which lives, grows, and becomes modified not only by its growth, but by external influences also. In like manner the tissues and groups of tissues are recognized as special modifications of masses of originally similar cells. Botanists now are able to reduce all the organs of plants to five categories, viz., thallomes, phyllomes, caulomes, rhizomes, and trichomes. The *thallome* is primitively a row of cells, but soon becomes several or many celled in cross section, or a flattened mass of one or more layers or cells. From this condition the passage is easy to the lobed form and the leafy shoot. The *phyllome* is always a lateral member on an axis (caulome), and in its simplest form is derived from a lobe of the thallome. Bracts are underdevelopments of leaves; scales are underdevelopments, but their cell walls have become firmer; the outer floral envelopes (sepals) are usually similar to bracts, while the inner (petals) usually have a more delicate tissue; stamens have a petallike tissue, usually little expanded, bearing pollen sacs; carpels bear ovules, around which they fold, making the ovule cavity. The *caulome* is the axial portion of the plant on which the phyllomes are borne. The typical caulome is the stem, which bears ordinary leaves. Other forms are runners, root stocks, tubers, corms, bulb axes, flower axes, tendrils, and thorns. The *rhizome* is the naked axial portion of the plant. The subterranean roots of ordinary plants are typical. The *trichome* is a surface appendage of one or more cells usually arranged in a row, sometimes in a mass. The typical form is seen in

the common hairs of many plants, especially those on the leaves and stems. Bristles, prickles, scales, and glands are common examples of other trichome forms.

Morphy, Paul Charles, 1837-84; American chess player; b. New Orleans; when twelve years old had defeated the best players in the city; became the champion of the U. S., 1857; subsequently defeated the best English, French, and German players; was able to play eight games simultaneously without seeing the boards.

Mor'ris, Gouverneur, 1752-1816; American statesman; b. Morrisania, N. Y.; admitted to the bar, 1771; member Provincial Congress of New York, 1775, and of Continental Congress, 1777-80; became Assistant Superintendent of Finance, 1781; member of committee that drafted the Federal Constitution, 1787; U. S. agent in London, 1791; minister to France, 1792-94; one of the fathers of the New York canal system; president of canal commission from 1810 till death.

Morris, Lewis, 1726-1806; American patriot; b. Morrisania, N. Y.; half brother of the preceding and son of Lewis Morris (1698-1762), chief justice of the Vice-Admiralty Court; elected to Congress, 1775-76; signed the Declaration of Independence when his extensive estate was in possession of the British, who consequently laid it waste and expelled his family.

Morris, Richard, 1833-94; English philologist; b. London; became Lecturer on the English Language and Literature, King's College, 1869; ordained curate of Christ Church, Camberwell, 1871; elected head master, Royal Masonic Institution for Boys, 1875; was one of the most efficient members of the Chaucer, the Early English Text, and the Philological Societies, and was chosen president of the latter, 1874. He published "The Etymology of Local Names," "Specimens of Early English," "Historical Outlines of English Accidence," "Elementary Lessons in Historical English Grammar," "Report on Pali Literature," "Folk Tales of India," and edited for the publishing societies numerous early texts.

Morris, Robert, 1734-1806; American financier; b. Lancashire, England; came to America, 1747; engaged in business in Philadelphia, 1754; opposed the Stamp Act, and against his business interests signed the Nonimportation Agreement, 1765; elected to the Continental Congress, 1775, 1776, 1777; voted against the Declaration of Independence as premature, but signed it; was Superintendent of Finance, 1781-84. Throughout the Revolutionary War his services in aiding the Government in its financial difficulties were of incalculable value; he freely pledged his personal credit for supplies for the army, at one time to the amount of \$1,400,000, without which the campaign of 1781 would have been almost impossible; he also established the Bank of North America. He was a member of the convention which framed the Federal Constitution, and, 1789-95, was U. S. Senator, declining in the mean-

time the proffered post of Secretary of the Treasury, and suggesting the name of Alexander Hamilton for that office.

Morris, William, 1834-96; English poet and artist; b. Walthamstow, Essex; was liberally educated; in 1856 founded *The Oxford and Cambridge Magazine*, which had but a year's existence; studied painting, but after 1863 devoted himself to the designing of furniture, wall paper, stained glass, etc.; was a leading spirit in the Socialist League, a contributor to the *Commonweal*, author of a volume of socialist lectures, "Signs of Change"; but for his advanced opinions would have been offered the laureateship after the death of Tennyson. Author of many works, including "The Defense of Guinevere and Other Poems," "The Life and Death of Jason," "Love is Enough," "The Story of Sigurd the Volsung and the Fall of the Niblungs," "Hopes and Fears for Art," translation of the "Æneid" and the "Odyssey," "The Roots of the Mountains"; in collaboration with Erick Magnusson, "The Story of Grettir the Strong," "The Story of the Volsungs and Niblungs," etc., translations from the Icelandic. A few years before his death he established at Hammersmith the Kelmscott Press, whence were issued expensive editions of his own works and those of other poets.

Morris Dance, rude dance common in England in the Middle Ages, and even now occasionally performed in the rural districts. The dragon or hobbyhorse, Robin Hood, Maid Marian, and other fantastic characters often bore a part in it. It was generally performed by young men gaudily decorated with colored ribbons and using bells, castanets, swords, etc.

Morris Island, low, narrow sand island on the S. side of the entrance into Charleston harbor, S. Carolina, a little more than 3½ m. long, lying broadside to the ocean. Soon after the outbreak of the Civil War (1861) the Confederates erected Fort Wagner and several batteries on Morris Island as part of the exterior line of defenses for Charleston. The S. end of the island was captured by an assault made from small boats by Union forces, July 10, 1863, and two unsuccessful assaults on Fort Wagner, located near the N. end, followed, July, 11th and 18th, the object being to get within effective breaching distance of Fort Sumter, occupying an interior line about 2,700 yards distant from Fort Wagner. After the assault of the 18th, it was determined to reduce Fort Wagner by a regular siege, and this was prosecuted vigorously. An assault was ordered for the morning of September 7th, but during the preceding night the Confederates evacuated the works.

Morrison, Robert, 1782-1834; first Protestant missionary to China; b. Maspeth, England; was appointed translator to the East India Company's factory at Canton, 1808, and began translating the Scriptures into Chinese. The New Testament appeared, 1814, and the Old Testament, 1818. His Chinese "Grammar," 1815, and "Dictionary," 5 vols., 1815-23, were his chief original works.

Morristown, capital of Morris Co., N. J.; 30 m. W. of New York City; is one of the oldest towns in the state; was twice the headquarters of the American army during the Revolutionary War, and has a memorial monument on the site of Fort Mifflin, which Washington had built on top of one of the surrounding hills. The building occupied by Washington as his headquarters, 1780, was built, 1772, was purchased by the Washington Association of New Jersey, 1873, and contains priceless relics of Revolutionary days. The city is in the great Morris Co. peach and rose belt; has an elevation of nearly 700 ft. above sea level, and is the home of many New York business men. At Morris Plains, 4 m. from the city, is the New Jersey State Lunatic Asylum, the largest institution of its kind in the U. S. when completed, which cost \$2,500,000, and has accommodations for 1,000 patients. The city has All Souls' and Memorial hospitals, Morris Academy, Dana Seminary, St. Hilda's School, Y. M. C. A. building, Y. M. Catholic Association building, public library and lyceum, St. Elizabeth's Convent, and a public park with a soldiers' monument. Pop. (1910) 12,507.

Morse, Jedidiah, 1761-1826; American geographer; b. Woodstock, Conn.; became pastor of the First Congregational Church, Charlestown, Mass., 1789; prepared the first geography published in America (1784), which was followed by larger geographies and gazetteers of the U. S., and for thirty years he was without an important competitor. He also published "A Compendious History of New England," with Elijah Parish, and "Annals of the American Revolution."

Morse, Samuel Finley Breese, 1791-1872; American painter and inventor; b. Charlestown, Mass.; son of the preceding; went to London, 1811, with Washington Allston to study painting in the Royal Academy; received a gold medal for an original model of "The Dying Hercules," 1813; returned to the U. S., 1815; settled in New York, 1822; was the principal founder of the National Academy of Design (1826), and its president sixteen years; Prof. of Fine Arts in the Univ. of the City of New York. In 1826 he began applying himself to the subject of electro-magnetism; 1835, erected in his rooms in the university his rude telegraph apparatus, and, 1844, with the aid of the National Government, established a telegraphic line between Washington and Baltimore, a distance of 40 m. Over this line, on May 24th, from the rooms of the U. S. Supreme Court, a message was sent to Baltimore, instantaneously received, and immediately returned. He was also the originator of submarine telegraphy, laying the first lines in New York harbor, 1842; constructed the first daguerreotype apparatus from designs by Daguerre, and took the first sun picture ever taken in America.

Mortality, liability or tendency to death; as commonly used, the ratio of deaths to population during a year, stated as being a certain number—such as 16 or 20—per 1,000, by which is meant that out of each thousand of the mean or average population of the place dur-

MORTALITY

ing the year, 16 or 20 died during the year. This ratio is also called the death rate. The following table shows the number that survive at different ages out of 100,000 persons living at ten years of age; also the expectation of life (or average after lifetime) and the yearly death rate at different ages:

Age.	Number Living.	Deaths per 10,000.	Expectation. Years.
10	100,000	68	48.36
11	99,324	68	47.68
12	98,650	68	47.01
13	97,978	68	46.33
14	97,307	69	45.64
15	96,636	69	44.96
16	95,965	70	44.27
17	95,293	71	43.58
18	94,620	71	42.88
19	93,945	72	42.19
20	93,268	73	41.49
21	92,588	74	40.79
22	91,905	75	40.09
23	91,219	76	39.39
24	90,529	77	38.68
25	89,835	78	37.98
26	89,137	79	37.27
27	88,434	80	36.56
28	87,726	81	35.85
29	87,012	83	35.15
30	86,292	84	34.43
31	85,565	86	33.72
32	84,831	87	33.01
33	84,089	89	32.30
34	83,339	91	31.58
35	82,581	93	30.87
36	81,814	95	30.15
37	81,038	97	29.44
38	80,253	99	28.72
39	79,458	101	28.00
40	78,653	104	27.28
41	77,838	106	26.56
42	77,012	109	25.84
43	76,173	113	25.12
44	75,316	117	24.40
45	74,435	122	23.69
46	73,526	128	22.97
47	72,582	135	22.27
48	71,601	143	21.56
49	70,580	151	20.87
50	69,517	159	20.18
51	68,409	169	19.60
52	67,253	179	18.82
53	66,046	191	18.16
54	64,785	203	17.60
55	63,469	217	16.86
56	62,094	231	16.22
57	60,658	247	15.59
58	59,161	264	14.97
59	57,600	282	14.37
60	55,973	303	13.77
61	54,275	326	13.18
62	52,505	351	12.61
63	50,661	378	12.05
64	48,744	408	11.51
65	46,754	441	10.97
66	44,693	476	10.46
67	42,565	515	9.96
68	40,374	556	9.47
69	38,128	601	9.00
70	35,837	649	8.54
71	33,510	702	8.10
72	31,159	758	7.67
73	28,797	819	7.26
74	26,439	885	6.86
75	24,100	956	6.48
76	21,797	1,032	6.11
77	19,548	1,115	5.76
78	17,309	1,204	5.42
79	15,277	1,301	5.09
80	13,290	1,404	4.78
81	11,424	1,514	4.48
82	9,694	1,632	4.18
83	8,112	1,759	3.90
84	6,685	1,897	3.63
85	5,417	2,051	3.38
86	4,306	2,225	3.10

MORTARS

Age.	Number Living.	Deaths per 10,000.	Expectation. Years.
87	3,348	2,422	2.84
88	2,537	2,653	2.59
89	1,864	2,924	2.35
90	1,319	3,237	2.11
91	892	3,610	1.89
92	570	4,053	1.67
93	339	4,572	1.47
94	184	5,163	1.28
95	89	5,843	1.12
96	37	6,486	.99
97	13	6,923	.89
98	4	7,500	.75
99	1	10,000	.50

In medical and hospital statistics, mortality is used to signify the ratio between the number of cases of a particular disease and the number of deaths occurring in those cases. For example, the mortality of Asiatic cholera is said to be about 30-80 per cent in epidemics; of yellow fever, from 15-85 per cent in different epidemics; of typhoid fever, from 5-20 per cent; of smallpox in unprotected persons, from 25-30 per cent; of scarlet fever, from 5-30 per cent in different epidemics; of diphtheria, from 10-12 per cent; of pneumonia, 30-40 per cent; and of women in childbirth, from 0.2-0.6 per cent, meaning always percentage of the number of cases observed.

Mortars, short cannon for throwing shells, usually fired at angles from 35° to 45° elevation, called "vertical fire," in contradistinction to the fire of long cannon, usually made at low angles. Mortars are believed to have been the first guns used, and, though changed from age to age frequently in form of chamber, size, and projectile, in all ages they have been found too useful in their special way to be given up, or,



MORTAR.

until very recently, to be essentially altered. Improvements have been made in mortars by lengthening them and rifling the bore, until they are really more properly rifled howitzers than mortars. They are accurate, and have long range, are made of all calibers up to 12 in. or larger, fire elongated projectiles with any desired velocity up to 1,000 ft. or more. The projectiles are loaded with large charges of gunpowder or high explosives, and are capable of producing very destructive effects. See ARTILLERY: BOMBARDMENT.

Mortgage (mawr'gāj), in law, according to Kent, "the conveyance of an estate by way of pledge for the security of a debt, to become void on payment of it." There usually accompanies a mortgage a bond or promissory note, or other promise to pay the debt. The debtor is called the mortgagor; the creditor is the mortgagee. This is advantageous to the creditor, since, if the land does not yield enough to pay the debt, he has a further remedy on the bond or note or promise for the deficiency. Where there is no such promise the mortgagee is confined in his remedies on the mortgage. The present theory in a court of equity is that a mortgage is a mere security for a debt, and that, accordingly, any attempt on the part of the creditor to obtain more than his debt and interest from the land is in the nature of a penalty, against the effect of which the court will relieve on payment of the amount actually due. On this theory the debt is the principal thing, and the land accessory. When the debt is transferred the assignee thereof is equitably entitled to the benefit of the mortgage, even without special mention; so when the debt is paid the mortgage is really extinguished, though it may in form continue. Mortgages are given on both lands and chattels.

Mortification. See GANGRENE.

Mortimer, Roger (Earl of March, Baron of Wigmore), abt. 1287-1330; English conspirator; b. on the Welsh frontier; served under Edward I in the Scottish War, 1306-7; was employed in high offices under Edward II in Scotland and France; joined the Earl of Lancaster in his rebellion against the king's favorites, 1320; was captured at the battle of Boroughbridge, 1322, and imprisoned in the Tower; escaped to France by the connivance of Queen Isabella; entered the service of King Charles IV of France, then at war with England; met Isabella at her brother's court at Paris, 1325; plotted with her against her husband; obtained possession of the young Prince Edward, heir to the throne; landed with Isabella at Orwell, September 24, 1326; deposed Edward II, 1327; proclaimed the young prince as king (Edward III); ruled the kingdom in his name; murdered the deposed king at Berkeley Castle, September 21, 1327; was seized by the king and Lord Montacute at Nottingham Castle; attainted by Parliament, and hanged at Tyburn. His attainder was reversed as illegal, 1354, and the title and estates restored to his grandson, who by alliance with the royal family was ancestor of the Tudor and all later sovereigns of England.

Mort'main (French, "dead hand"), perpetual tenure of land by corporations. More commonly, however, the term is used to designate the holding of land by the Church, by religious corporations, and pious foundations. The expression *manus mortua*, which occurs in public documents as early as the middle of the ninth century, is probably derived from the fact that persons who became members of religious corporations and ecclesiastical communities were civilly dead—that is, were regarded in the law as dead, so that property held by them was, as it were, in dead hands. The amount of the

lands which during the Middle Ages and the centuries immediately succeeding passed into the hands of religious corporations, and which were thus in mortmain, throughout all the countries of Europe was enormous. English legislation against mortmain begins with "Magna Charta" (A.D. 1217), and continues down to 1888. The statute of mortmain of 1279 provided that lands so attempted to be conveyed should be forfeited.

There are, strictly speaking, no general laws against mortmain in the U. S., except in Pennsylvania. The absence of the feudal régime, for whose protection such laws were rendered necessary in Europe, and still more, perhaps, the lack of any causes of irritation—owing to the comparative poverty of religious corporations and the cheapness and abundance of land in the Western World—sufficiently account for the dearth of such legislation in the U. S. Corporations are legal persons, and at common law, unrestrained by statutes of mortmain, have the same capacity to take and hold lands that natural persons have. In the U. S., as in England, they are usually prohibited from acquiring or holding more land than is necessary for the purposes of their incorporation. Ordinary or business corporations cannot take land by devise; charitable corporations, however, are usually allowed to take it both by deed and by will. In a few of the states there are statutes restricting the creation of charitable uses by will.

Morton, Henry, 1836-1902; American physiologist; b. New York City. While studying law in Philadelphia, he lectured on chemistry and physics at the Episcopal Academy, originating the scientific course in that institution, and filling a chair created for him, when his growing predilection for physical and for chemical science induced him to give them his entire attention. In 1863 he was elected Prof. of Chemistry at Philadelphia Dental College; 1864, became resident secretary of the Franklin Institute of Pennsylvania; and in April of that year began the delivery in the Academy of Music, Philadelphia, of a course of lectures on light, which excited great attention both in the U. S. and in Europe, on account of the originality and brilliancy of their experimental illustrations. In 1869 he was elected Prof. of Chemistry in the Univ. of Pennsylvania, and, 1870, was appointed president of the Stevens Institute of Technology at Hoboken, N. J., then just founded, holding the office till his death. He published many papers in scientific journals, and was author of the poem, "The Hand that Rocks the Cradle Rules the World."

Morton, James Douglas (fourth Earl), 1530-81; Regent of Scotland; b. Dalkeith; was a younger son of the great family of Angus, but, 1553, succeeded to the estates and title of his father-in-law, the third Earl of Morton. In 1561 he became Privy Councillor, and, 1563, Lord High Chancellor. He participated in the murder of Rizzio, and fled to England, but was pardoned, and after the forced abdication of Mary was reinstated as Lord Chancellor. After the assassination of Murray he was the leader of the Protestant Party. In 1572 he

was elected regent, and thenceforth he ruled Scotland with great rigor. He resigned, September 12, 1577, but soon regained his authority. Being brought to trial for participation in the murder of Darnley, he was found guilty of high treason and decapitated.

Morton, Thomas, abt. 1575–1646; English adventurer; was a lawyer at Clifford's Inn, London; was leader of the colony sent by Weston to settle in Massachusetts, June, 1622; went back to England; returned with Capt. Wollaston in 1625; settled at Mt. Wollaston, now Braintree, where on May Day, 1626, he presided over a scene of merriment very obnoxious to Puritan ideas, setting up a Maypole, and naming the spot Ma-re Mount or Merry Mount. The people of Plymouth, hearing of these proceedings, came in force two years later, headed by Capt. Miles Standish, cut down the pole, carried Morton away, and sent him back to England. He returned to Massachusetts in 1629, but was again seized and transported, and his house torn down, 1630. He published a satirical work, "The New English Canaan" (Amsterdam, 1637); went again to Massachusetts, 1643; was imprisoned a year for his "scandalous book"; removed to what is now Maine.

Morton, William Thomas Green, 1819–68; American dentist; b. Charlton, Mass. While practicing his profession he attended medical lectures, and studied chemistry in the laboratory of Dr. Charles T. Jackson, and there became acquainted with the anæsthetic properties of sulphuric ether. After experimenting on himself, he successfully administered it to a dental patient, September 30, 1846. The new anæsthetic was first used publicly by Dr. John C. Warren in an operation at the Massachusetts General Hospital, October 16, 1846. Morton's claim to the discovery was hotly contested, notably by Dr. Jackson and Horace Wells. The French Academy, after an investigation, of the Montyon prize awarded 2,500 fr. to Dr. Jackson for the discovery, and 2,500 fr. to Dr. Morton for its application to surgical operations.

Mosaic, inlaid work having the effect of a painting, made by fitting together on a ground of cement small pieces of stone or other material, natural or artificial, of various colors and shapes. In the Vatican establishment at Rome, the slab on which the mosaic is made is generally of Travertine or Tibertine stone. In this the workman cuts a certain space, on which mastic or cementing paste is gradually spread as the work requires it, thus forming the adhesive ground on which the mosaic is laid. Into this paste are stuck the *smalti* or small pieces which compose the picture. These consist of a variety of minerals and materials, colored for the most part with metallic oxides. When the cement has sufficiently hardened, the work is polished. Two other species of mosaic work are carried on in Tuscany (whence the name, Florentine mosaics), the *pietre dure*, which gives the objects depicted in relief in colored stones, and the *pietre commesse*, which consists of precious stones, as agates, jaspers,

lapis lazuli, etc., cut into thin veneer and inlaid. Roman mosaic is made of very thin glass rods of many colors. See **INLAYING**.

Moscheles (mōsh'è-lēs), **Ignaz**, 1794–1870; Bohemian pianist; b. Prague, of Jewish parents; spent 1820–45 in London; established himself in Leipzig, 1846, became director of the conservatory there, and had for pupils Thalberg and Mendelssohn; composed sonatas, concertos, fantasias, variations, and studies for the piano.

Moscow (mōs'kō), former capital of the Russian Empire, a great manufacturing and commercial center, and now the second imperial residence; 400 m. SE. of St. Petersburg; is in a hilly, fertile, and beautiful district on the Moskva River, and presents, when seen from the Sparrow Hills on its S. outskirts, a most picturesque appearance, spires and domes in old Byzantine style rising beside palaces and public buildings in the modern French and Italian. It consists of five different parts: (1) Kremlin, the central part of the city, occupying a hill on the N. bank of the Moskva, and surrounded by heavy stone walls. It contains the palaces of the Czar, the Patriarch, and the Holy Synod, the arsenal, the treasury, and other public buildings, the Cathedral of the Assumption, in which the czars are crowned, built in the fourteenth century, and gorgeously decorated; the Cathedral of St. Michael, in which the czars before Peter the Great are buried; the tower of Ivan Veliki, 270 ft. high, surmounted by a gilded dome 37 ft. high, and containing thirty-two bells; the Kolokol, the largest bell in the world, weighing 448,000 lb., placed on a pedestal close by, etc. (2) Kitaigorod, or the "Chinese city," to the E. of the Kremlin, also surrounded by a wall with towers and gates, is the seat of the trade of the city. Here is the Petrovskoi cathedral, properly consisting of twenty-one chapels joined together. (3) Beloigorod, or the "white city," because it is surrounded by a wall of whitish stone, encircles the Kremlin and Kitaigorod on three sides. Here are the palaces of the governor and the nobility, the university, several immense monasteries, the founding hospital, the theaters, the post office, and other government houses, and the famous drill-house, 560 ft. long and 158 ft. wide. (4) Zemlianoigorod, or the "earthen city," because it was formerly surrounded by an earthen wall, which now has been transformed into promenades. (5) The Slobodi, or suburbs, eight in number; in these splendid mansions and magnificent monasteries, schools, hospitals, etc., surrounded with large and beautiful gardens, alternate with clusters of shanties, and with manufacturing establishments.

The city has water communication with the Baltic, the Black, the White, and the Caspian seas, and it is connected with St. Petersburg, Nijnii-Novgorod, Taganrog, and Warsaw by rail. It carries on an immense trade in tea, grain, cotton, timber, furs, tallow, metals, and its own productions. It rivals St. Petersburg as the first manufacturing place in Russia, and its factories of cotton, wool, silk, tobacco, paper, chemicals, leather, pottery, watches, silver,

and other metals are very extensive. Moscow was founded in the twelfth century, and in the fourteenth it became the capital of the empire and the residence of the Grand Duke of Moscow. In 1712 Peter the Great transferred the capital to St. Petersburg, but Moscow, being a sacred city, continued to stand as the first

Moselle (mō-zēl'), river of France; rises in the Vosges at an elevation of 2,260 ft., and flows with a tortuous course of 330 m. through France, Belgium, Luxemburg, and Rhenish Prussia, where it joins the Rhine at Coblenz. Its broad valley is covered with vines, celebrated for the light wine they yield.



Mosque.

city in the estimation of the Russian nation. It was the winter residence of the Russian nobility, and by its commerce and industry grew rich. In 1812 it was entered by the French under Murat, September 14th, and on the 15th by Napoleon, who took up his residence in the Kremlin. The city, deserted by its inhabitants, was set on fire by order of the governor, Count Rostoptchin, which compelled Napoleon to leave, October 19th, and to take his final departure on the 23d, and resulted in the disastrous retreat of the French army. The greater part of the city was destroyed, but it was rebuilt within a few years. Pop. (1907) 1,359,254.

and the book of Acts), Moses was forty years old when he fled into Arabia, eighty when he led the march to Sinai, and one hundred and twenty when he died on Mt. Nebo.

Mosheim (mōs'hīm), Johann Lorenz von, 1694-1755; German theologian; b. Lubeck; was Prof. of Theology at Helenstädt, 1723-47; Prof. and Chancellor at Göttingen from 1747 till death; works of permanent value, "Institutes of Ecclesiastical History," "Christianity before Constantine," and "Morality of the Holy Scriptures."

Mos'lem. See MOHAMMED; MOHAMMEDANISM.

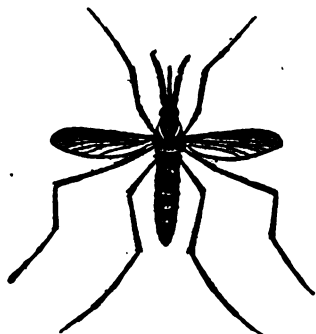
Mosenthal (mō'zēn-tāl), Salomon Hermann, 1821-77; German dramatist; b. Cassel, Hesse; became archivist under the Austrian Govt. at Vienna, 1851. Of his many successful dramas, two, "Deborah" and "Sonnenwendhof," have been translated into the English, Danish, Hungarian, and Italian languages.

Möser (mé'zēr), Justus, 1720-94; German historian; b. Osnabrück; held several important government offices; became the father of modern German historiography, declaring that the true historian should direct his attention more to the changing conditions of the people, their laws, customs, and habits, than to dry recitals of dynasties and wars; illustrated his theory in "History of Osnabrück" and "Patriotic Reveries."

Mo'ses, leader, prophet, and legislator of the Jewish people; was born in Egypt, abt. 1600 B.C., during the oppression of the Jews. According to tradition, was appointed by God to deliver the Jews from bondage in Egypt, and given power to prove his mission by miracles. After the visitation of the ten plagues upon the land, Pharaoh allowed the Hebrews to depart and Moses led them safely through the Red Sea. During their encampment on Sinai he received the Ten Commandments for the regulation of the lives of the Israelites. For nearly forty years they were wanderers in the wilderness under his guidance. He appointed Joshua his successor and did not live to see them settled in their new country. According to the biblical narrative (in the Pentateuch

Mosque (mōak), Mohammedan temple of worship. It usually consists of a series of porticos surrounding an open court, having in its center trees and a fountain for ablutions. The architectural character is usually peculiar; the dome (of Byzantine origin), the minaret (originally the Christian campanile, in which, however, the muezzin's cry takes the place of the forbidden bell), and the arched gateway are usual peculiarities, but the local modifications in the style of mosques are numerous. Lamps, arabesques, and passages from the Koran take the place of paintings and statues. None may enter save with unshod feet. The congregations are usually composed of males only. There are sometimes schools, dispensaries, and hospitals within the mosque. Mohammed himself built the first mosque at Medina. See illustration on page 338.

Mosquito (mōs-kē'tō), name given to many biting and blood-sucking dipterous insects, mostly of the family *Culicida*, and of the genera *Culex*, *Anopheles*, *Corethra*. The female insects alone bite, or rather thrust into the flesh their awllike bristles, massed together into a tube, through which they draw the



MOSQUITO (much enlarged).

blood. The distress these insects occasion is very great, and investigations prove them an important factor in the dissemination of yellow fever and malaria. The use of mosquito netting, the kindling of dense smoky fires, and the application of tar, pennyroyal oil, or decoction of feverfew to the skin—all have some effect in protecting the person from their attacks. The female deposits her eggs on the surface of the water, and the larvæ constitute an important food of fishes.

Moss, any member of the large family of cryptogamic plants, having distinct stems, leaves, flowerlike reproductive organs, and seed-like bodies or spores which serve to propagate the species. They are cellular, and bear only a faint resemblance to the higher orders of plants. Very little is known of the uses of the mosses. In the economy of nature they serve as precursors of the higher plants, appearing first on sterile places, and collecting among their matted and tufted stems the dust and sand. They afford secure lodging places for insects in winter, as well as food for them in summer. Some species of *sphagnum* enter

largely into the formation of peat bogs. A great number of woody plants are found growing with the sphagnum, and these decaying together with the moss form peat of various qualities. The geographical distribution of the mosses is extensive; scarcely any part of the earth's surface is destitute of them, from the



MOSS PLANT IN "FLOWER."

a, antherids and hairs (paraphyses); b, archegones and paraphyses (magnified).

polar regions to the equator. They constitute with lichens almost the only vegetation on the coast of the Polar Sea, where the soil never thaws to a depth of more than a few inches. The N. seacoast of Siberia is an immense morass whose entire surface is covered with mosses. The schistose rocks of Spitzbergen, rising above the everlasting ice, are covered with these plants. They enter largely into the flora of Greenland; the loftiest Swiss Alps, and the volcanic scorïæ of Iceland, afford abundant species. See LICHEN.

Moss Ag'ate. See CHALCEDONY.

Moss'bunker. See MENHADEN.

Moss Fowl. See RED GROUSE.

Moss Starch. See LICHENIN.

Mostar, capital of Herzegovina, Austro-Hungarian Empire; on the Narenta, here crossed by a celebrated Roman bridge consisting of one arch of 95 ft. (hence its name, *Most Star*, Old Bridge); 35 m. from the mouth of the river and 40 m. SW. of Serajevo; manufactures knife and sword blades and fine silks, and the vicinity produces an excellent wine. Pop. (1905) 14,370.

Most Fa'vored Na'tion Clause, in commercial treaties, a clause which binds each of the treaty-making powers to give to all the contracting parties all the privileges which it then gives, or afterwards may give, to that nation which receives from it the most favorable terms in respect to those matters.

Mo'sul, chief town of vilayet of Mosul, Asiatic Turkey; on the Tigris, opposite Nineveh. Formerly a prosperous manufacturing city, its fine cotton fabrics, called muslins, were exported to Europe. Now its manufactures have almost ceased, its bazars are filled with European goods and even its transit trade

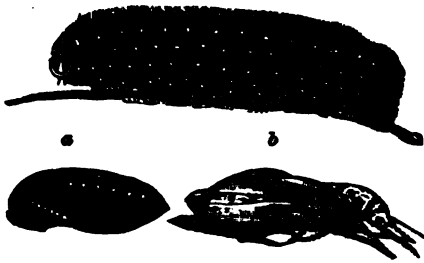
has largely diminished, as Kurdish tribes render the neighborhood insecure. Pop. abt. 61,000.

Moth, insect of the order *Lepidoptera*. Moths are distinguished from butterflies and sphinges (or hawk moths) by the antennæ, which are mostly threadlike or having the form of a



DEIOPEIA BELLA.

comb in moths, knobbed in butterflies, and enlarged in the middle in the sphinges. Moths are mostly, but not always, nocturnal; sphinges mostly crepuscular (flying by twilight); and butterflies diurnal. Among the best-known



SALT MARSH CATERPILLAR.
a, pupa; b, moth.

moths are the silkworm moths (*Bombyx mori*) and the clothes moths (*Tinea flavifrontella*, *T. tapetzella*, or carpet moth, etc.). Their larvae attack woolens, furs, feathers, etc., and more rarely cotton goods.

Moth'er Ca'rey's Chick'en, or **Storm'y Pe'trel**, name applied to various little petrels belonging to the genera *Procellaria*, *Cymodroma*, *Oceanodroma*, etc., which to the untrained eye look much alike, but more properly restricted to *Procellaria pelagica*, a bird about 6 in. long and 14 in. spread of wing. The color is brownish black above, a little browner below, and there is a conspicuous white patch on the rump. This petrel is common in parts of the N. Atlantic, but is the rarest of the little petrels found along the E. coast of the U. S. It can be readily distinguished among them by its square tail, short legs, and entirely black feet. It nests in crannies among rocks, and lays a single white egg with a few faint markings around the larger end. The bird has a rank, musty odor, and when captured, besides biting and scratching, defends itself by ejecting from its mouth an ill-smelling, oily fluid, the partly digested contents of its stomach. The superstitious dread in which this bird is said to be held has been greatly exaggerated. It is doubtful if it ever was regarded as the harbinger of a storm, because in some localities it is, at proper seasons, always common, and it

is most noticeable during a gale because, being then prevented from readily obtaining its customary food, it hovers about ships in search of scraps of food. See PETREL.

Mother of Pearl. See PEARL.

Mo'tion. See HEAT; MECHANICS.

Mo'tive, that which occasions or tends to bring about a voluntary movement, such as a consideration, inducement, end, etc. The word is used most generally by psychologists to denote any influence whatever which tends to bring about voluntary action on the part of a normal person. Motives fall into two great classes, according as they represent pictured objects of pursuit on one hand, or the subconscious, organic, habitual, or purely affective springs of action on the other, whose main influence is the coloring they give to consciousness as a whole. The former class of motives are *ends*, the latter *affects*. No sharp line can be drawn between them, for they pass constantly into one another. Yet in consciousness the line is both plain and important; for it is only "ends" which are available as distinct lines of direction for volition, in definite cases of choice. All states of feeling whatever tend to discharge themselves in action through the muscles. We feel the force, the motive worth, of a suggestion, a pain, an impulse. An idea simply as an idea—if such could be realized—might not react in movement; but the simple presence of an idea in consciousness itself gives feeling, and only in so far as it affects us does it move us to action. We may accordingly apply the term *affects* to all involuntary stimuli to movement. The other class of motives may be called ends; which are actual considerations in consciousness which we weigh and measure, as in reaching a decision. Technically they are called *presentations*, since they are mental images which consciousness presents to itself as worth preserving. The attitude of the mind toward such ends is *desire*.

Mot'ley, John Lothrop, 1814-77; American historian; b. Dorchester, Mass.; admitted to the bar, 1836; became, 1841, secretary of legation at St. Petersburg; U. S. minister to Austria, 1861-66; to England, 1869-70. After long and exhaustive researches and manifold preparations he published in London, 1856, "The Rise of the Dutch Republic," 3 vols., which immediately attracted great attention, and has been translated into German, French, Dutch, and Danish. "The History of the United Netherlands" followed, 4 vols., 1861-68, and the "Life of John Van Barneveld," 1874, with equal success.

Motoori (mō-tō-rē), Morinaga, 1730-1801; father of modern Japanese literature; b. Matsuzaka, Ise; wrote on politics in the "Tamakushize," on history in the "Manyoshu," "Kokinshu," and "Genji Monogatari," on archaeology and the history of religious traditions in the "Kojikiden"; and prepared the way more than any other man for the restoration, 1868, of the emperor to his ancestral rights.

Mo'tor Car'riages. See AUTOMOBILES.

Mott, Lucretia (COFFIN), 1793-1880; American reformer; b. Nantucket, Mass.; removed, 1804, to Boston, and, 1809, to Philadelphia; where, 1811, she was married to James Mott; became, 1817, a teacher and, soon after, a preacher of the Society of Friends; adhered after 1827 to the Hicksite party; was one of the original founders of the American Antislavery Society, 1833; for many years preached against slavery, war, and other evils, and became a leader in the woman-suffrage movement.

Mott, Valentine, 1785-1865; American surgeon; b. Glen Cove, L. I.; was Prof. of Surgery in Columbia College, 1809-26; in Rutgers Medical College, 1826-30; in College of Physicians and Surgeons, New York, 1830-40, and in University Medical College, New York, 1840-60; was a very successful surgical operator; invented valuable surgical implements; had wide fame as an *accoucheur*; was a brilliant lecturer; published a translation of Velpeau's "Operative Surgery," with large additions; a volume of clinical lectures, and many papers and addresses.

Mot'to, word, phrase, or sentence, used as a declaration of faith or allegiance, as a war-cry in the Middle Ages, as a part of the achievement of arms in heraldry, or merely as a badge, sometimes inherited. While some mottoes originated as a remark or boast appropriate to special occasion (e.g., *Dieu et mon Droit*—God and my right—the utterance of Richard I at the battle of Gisors), most mottoes have been chosen deliberately for their meaning and euphony; such obvious phrases as *Semper idem* (Always the same) and *Esse quam videri* (To be rather than to seem) have been taken by many persons. The mottoes of nations in Europe are generally those of their reigning families, or of their chief honorary orders, but cities and towns all through the Middle Ages had mottoes of their own; and from this custom have come the mottoes of the states of the American Union. Virginia has *Sic Semper Tyrannis* (So [let it be] always to tyrants), in allusion to the dagger in the escutcheon; New York has *Excelsior*; and the Union itself *E Pluribus Unum*.

Mouflon, animal of the genus *Ovis*, found in S. Europe, and closely related to the common sheep, with which it breeds, and to the big-horn. Its fleece is not woolly.

Moukden (mók-dén'). See MUKDEN.

Mould, Jacob Wrey, 1825-86; American architect; b. Chiselmhurst, England; pupil and associate of Owen Jones; illustrated vol. II of Jones's "Alhambra," and assisted on his "Grammar of Ornament"; with him designed the Moresque-Turkish divan of Buckingham Palace and the decoration of the World's Fair exhibition buildings of 1851; removed to New York to design and superintend construction of All Souls' Church; afterwards was assistant to Calvert Vaux, chief architect of Department of Public Parks, and his successor; employed, 1857-74, in designing and laying out Central Park; last work, design for temporary tomb of Gen. Grant.

Mould. See MUCORACEÆ.

Mould'ing. See MOLDING AND CASTING.

Moulins (mô-lân'), capital of department of Allier, France; on the Allier, here crossed by one of the finest bridges in France; 124 m. NW. of Lyons; is a beautifully situated and handsomely built town, with a fine cathedral, large cavalry barracks, and important manufactures of cotton and cutlery. Pop. of commune (1901) 22,340.

Moult'ing, periodical casting off of shell, skin, horns, feathers, or other parts of the integument, such as takes place once a year or oftener (in some animals once every few days) among serpents, batrachians, spiders, insect larvae, etc. Birds in many cases shed their feathers annually, and many quadrupeds also shed their coat of hair nearly all at once. Deer mostly renew their horns completely every year.

Moultrie (mô'trī), William, 1731-1805; American military officer; b. South Carolina; constructed and defended the fort on Sullivan's Island, Charleston harbor, subsequently named for him, 1776; defended Charleston, 1780; was Governor of South Carolina, 1789 and 1794-96; and author of "Memoirs of the Revolution."

Moultrie (môl'trī), Fort. See FORT MOULTRIE.

Mound. See BARROW.

Mound Builders, in American archaeology, the constructors of an extensive series of ancient remains, of uncertain date, scattered over the upper Mississippi and Ohio River valleys. These remains vary greatly in size and character, and evidently were erected by different peoples widely apart in time, but approximating

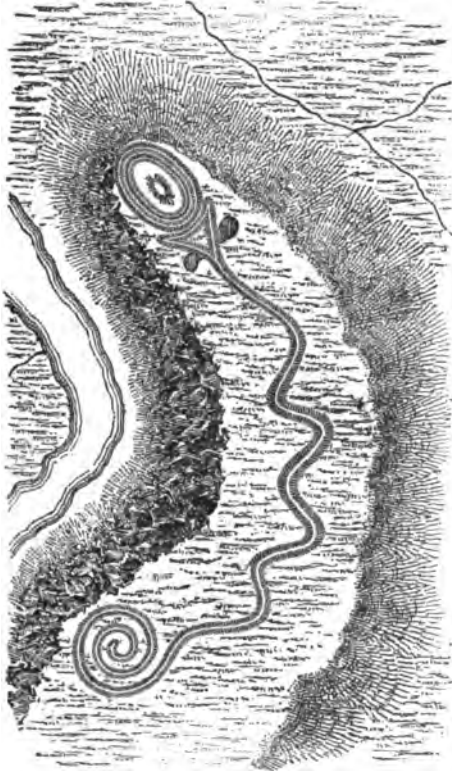


ANIMAL-SHAPED MOUND, WISCONSIN.

each other in the general level of their culture. The mounds or tumuli are of earth or earth mingled with stones, and are of two general classes, the one with a circular base and conical in shape, the other with a rectangular base and a superstructure in the form of a truncated and terraced pyramid. The former are generally found to contain human remains, and are therefore held to have been barrows or sepulchral monuments raised over the distinguished dead, or, in some instances, serving as the communal place of interment for a gens or clan. The truncated pyramids, with their flat surfaces, were evidently the sites for buildings, such as temples or council houses, which, being constructed of perishable material, have disappeared. Many of the mounds are small in size, scarcely visible above the general level of the

soil, while others reach extraordinary proportions. One at Moundsville, W. Va., is 70 ft. high and 900 ft. in circumference; a rectangular, truncated mound at Marietta, Ohio, is 188 ft. long, 132 ft. wide, but only 10 ft. high; one at Cahokia, Ill., is 97 ft. high, rising from a base in the form of a parallelogram, with sides measuring 700 and 500 ft., respectively.

They are most numerous in S. Ohio and S. Illinois. According to a careful estimate, there are more than 10,000 in the former state alone.



SERPENT-SHAPED MOUND, ADAMS COUNTY, OHIO.

Many of them are connected with extensive artificial embankments and earthworks, inclosing large areas in lines representing accurately geometrical figures, usually the square and the circle. One of these, in Ross Co., Ohio, incloses 140 acres; while that known as Fort Ancient, on the Little Miami River, extends in the whole circuit of its embankments about 4 m. Nearly 1,500 of such inclosures have been enumerated in Ohio and over 100 in Ross Co., which seems to have been one of the centers of population of this ancient people. Another class of mounds occasionally found in Ohio, but much more abundant in Wisconsin, are those known as animal or effigy mounds. These are of slight elevation, at most 3 or 4 ft., and represent in outline the figure of some animal in gigantic size, often several hundred feet in length. Several remarkable examples of such mounds are found in Ohio, as the Great Serpent mound in Adams Co. and the so-called Alligator (prob-

ably an opossum) in Licking Co. It is generally supposed that the object of these effigy mounds was to represent the "totemic animal" or mythical ancestor of the gens or tribe.

The period when the mound builders flourished has been differently estimated; but there is a growing tendency to reject the assumption of a very great antiquity.

Mounds'ville (formerly GRAVE CREEK, renamed from large mound in vicinity), capital of Marshall Co., W. Va.; on the Ohio River; 12 m. S. of Wheeling; is in a coal-mining and farming region; has cotton and woolen mills, glass, mineral wool, and shoe factories, brick works, and several sawmills and coal banks; and contains the State Penitentiary. The work of the mound builders here consists of a conical structure, about 70 ft. high and 900 ft. in circumference at the base. A shaft sunk from the apex to the base, 1838, disclosed two sepulchral chambers, formed of logs and covered with stones, containing human skeletons.

Moun'tain, considerable elevation of the earth's surface, either isolated or arranged in a linear manner. Great regions of the earth are much elevated above the sea, forming high plains, called tablelands or plateaus, from which mountains often rise. Such are the great plain of Tibet, in great part over 14,000 ft.; that of W. Asia, from 4,000 to 8,000; and that of W. N. America, of about the same height, from which rise the Rocky Mountains and the Sierra Nevada. The elevation of mountains is generally calculated from the sea level. With few exceptions, the mountains of the earth are arranged in continuous lines or chains, and a mountain system consists of parallel chains. The great mountain system of America is that which has been called the Pacific highlands, extending from Alaska to Cape Horn along the W. part of the continent. It consists in the U. S., exclusive of Alaska, of the Rocky Mountains to the E. and the Sierra Nevada and Cascade Mountains to the W., rising from the broad tableland already mentioned, and having between them the great central basin with its subordinate mountain ranges. The highest points in both of these chains attain about 15,000 ft. The highest mountains in Alaska are Mt. McKinley, 20,464, and Mt. St. Elias, 18,024, and in Mexico, Popocatepetl and Orizaba, each nearly 18,000 ft.

In S. America the same great continental system consists of two, and in some parts of its course of three, chains. The general breadth of the whole system of the Andes is between 100 and 300 m., and the greatest height is attained in the plateau of Bolivia and in Chile, where there are peaks of from 20,000 to 23,000, or, according to some, 25,000 ft. In E. N. America are the Atlantic Highlands or Appalachians, extending from the Gulf of St. Lawrence to Alabama; these attain their greatest elevation in the Black Mountains of W. N. Carolina, where there are several peaks of over 6,000 ft., one reaching 6,700 ft., and in New Hampshire, where the highest, Mt. Washington, is 6,293 feet. From the plateau of Brazil rises along its E. portion a chain corresponding to the Appalachian; and in Africa there are similar high-

lands on the two sides of the continent, those of the E. attaining an elevation of about 19,000 ft. A like arrangement of highlands is seen in Australia, where the highest elevation is about 7,000 ft. In Europe the Scandinavian and the Ural mountains are N. and S. chains, like the Appalachians; but the great mountain systems of the E. hemisphere have a general E. and W. direction. The Pyrenees, the Alps, the Balkan, the Caucasus, the Himalaya, and various subordinate ranges, mark this great mountain belt.

The Pyrenees have a crest line of about 8,000 ft., but attain in some peaks 11,000; the Alps have an average height of from 10,000 to 12,000 ft., the highest peak being Mont Blanc, 15,781 ft.; while the Himalayas rise in many points to 25,000 ft., and attain in Mt. Everest 29,000 ft., and the Thian-shan range, N. of these, is from 15,000 to 20,000 ft. We must distinguish two classes of mountains, of widely different origin: those which are produced by the accumulation of matters ejected from volcanic vents and those which have been formed by erosion. The first class, of which Etna and Vesuvius may be taken as types, have been built up as an anthill is raised by matters brought grain by grain from below the surface. The mountains of purely volcanic origin are insignificant when compared with the great systems of mountains which are not volcanic, or in which the presence of volcanic vents is but a secondary fact. These mountains are due to erosion, and are the remains of great plateaus, the larger part of which has been removed. They are but fragments of the upper crust of the earth, separated by valleys which represent the absence or the removal of mountain land. The popular conception is that mountain chains are due to the folding and plication of strata; but careful study of their structure shows that these are but accidents of structure, in no way essential to the formation of mountains, and sometimes absent.

Mountain, The. See MONTAGNARDS.

Mountain Ash, or **Row'an Tree**, popular names of small trees, often seen in cultivation, belonging to the order *Rosaceæ*, suborder *Pomaceæ*. They are *Pyrus aucuparia* of Europe, and *P. americana* and *P. sambucifolia* of N. America. They have compound, feather-shaped (pinnate) leaves, and in autumn clusters of small acid bright-red fruit. The European tree is most common in cultivation. The wood of all is hard and suitable for turnery. The peasantry of nearly all nations of Europe ascribe supernatural qualities to the wood of the rowan tree, which is used for divining rods and the like.

Mountain Lime'stone, geologic formation of Carboniferous age, occurring in Great Britain. It is metalliferous, lead being the most important ore. Fluorspar, a little petroleum, a few small coal seams, quarries of building stone, and some iron and copper ore are among its economic resources. The name has also been applied to Carboniferous limestones in the U. S., but is no longer so used.

Mountain Li'on. See PUMA.

Mountain Mead'ows, Mas'sacre, in American history, a massacre near Mountain Meadows, Utah, of 123 emigrants on their way from Arkansas and Missouri to California. Attacked while in camp by Indians and, it is supposed, by disguised Mormons, they held their barricade of wagons for three days; they were then promised protection by an Indian agent and a Mormon bishop, John D. Lee, and left their barricade, but were all slaughtered, except seventeen children, who were distributed among Mormon families, but finally restored by the U. S. Govt. to their relatives.

Moun'tains of the Moon, range formerly believed to extend across central Africa, according to Ptolemy, the sources of the Nile. Modern geographical search has failed to find a range in the locality designated by early geographers. Capt. Speke gave the name, 1858, to a range N. of the newly discovered Lake Tanganyika; and the Duc d'Abruzzi, the Italian explorer, claimed, 1906, to have gained the summit of the loftiest peak of the little-known Ruwenzori range, near the equator and just N. of the Albert Edward Nyanza, said to reach an elevation of 18,000 ft.

Mount Cal'vary. See CALVARY, MT.

Mount Carmel (Palestine). See CARMEL, MT.

Mount Desert' Is'land, mountainous island of the Atlantic, in Hancock Co., Me.; 14 m. long and 7 wide. Soame's Sound divides it nearly in two. Bar Harbor, Northeast and Southwest Harbors, Asticou, Soamesville, Seal Harbor, Seal Cove, and East Eden are among the villages. It abounds in beautiful lakes. The highest point is Green Mountain, 1,535 ft. high. The island is a favorite place of summer resort.

Mount Er'ebus. See EREBUS, MT.

Mount Et'na. See ETNA.

Mount Hood. See HOOD, MT.

Mount Ol'ivet. See OLIVES, MOUNT OF.

Mount McKin'ley. See MCKINLEY, MOUNT.

Mount-Ste'phen, George Stephen (Baron), 1829- ; Canadian capitalist; b. Dufftown, Scotland; removed to Canada, 1850, and, engaging in business as a merchant in Montreal, amassed great wealth; became president of the Bank of Montreal, 1876; president of the Manitoba and Minneapolis Railway, 1878, and president of the Canadian Pacific Railway, 1881, an office which he held until his resignation, 1888. In 1887 he and his cousin, Sir Donald Smith, gave \$1,250,000 to found the Victoria Hospital at Montreal, completed 1893. In 1886 he was created a baronet for his services in connection with the Canadian Pacific Railway, and, 1891, was raised to the peerage.

Mount Ter'ror. See EREBUS, MT.

Mount Ver'non, city in Westchester Co., N. Y.; on the Bronx River; 13 m. NE. of the Grand Central Depot, New York; includes the former village of Mount Vernon, the suburb of Chester Hill, and a part of the town of East-

chester. Some parts of it are about 200 ft. above tidewater, and command an extensive view of Long Island Sound. Pop. (1910) 30,919.

Mount Vernon, magisterial district in Fairfax Co., Va.; on the Potomac River; 15 m. below Washington, D. C.; contains the home and tomb of George Washington, the former having many relics of the Washington family.

Mount Vernon La'dies' Association, oldest patriotic association of women in existence in the U. S.; founded, 1854, for the purpose of purchasing the Mount Vernon estate, including the mansion and Washington's tomb. In 1858 the association was able to purchase from John A. Washington, Jr., and his heirs 200 acres of the Mount Vernon estate, including the tomb, the mansion, attendant buildings, the wharf, etc., for \$200,000 and interest. In 1887 a tract of 35 acres adjoining Mount Vernon was presented to the association by Jay Gould. At present the entire property includes 237 acres.

Mourn'ing, the official or conventional expression of grief. It has varied much. The Hebrews tore the garments, cut the hair and beard, strewed ashes on the head, went bareheaded and barefooted, and lay down on the ground weeping and smiting the breast; the period of mourning was seven days, but for Moses and Aaron they mourned thirty days. The Greeks cut off the hair, put on a coarse, black garment, retired into seclusion, and wailed. When a great general died the whole army cut off their hair and the manes of their horses. The period of mourning was in Athens thirty days, but in Sparta only ten. With the Romans the mourning was mostly done by the women; the men wore black clothes, but only for a few days. Public mournings often occurred in the days of the republic on the occasion of some public calamity or on the death of some great man; during the empire, on the death of an emperor. Then all business stopped; the temples, the Forum, the schools, and the baths were closed. The mourning color was black under the republic, but during the empire white became the mourning color for women. The mourning rites among barbarians and half savages are often horrible, frequently involving serious mutilations. Among civilized nations the mourning customs have become very similar in modern times, and consist mostly in retirement within the house and avoidance of what is bright and noisy. In Europe and America the mourning color is black; in Turkey, violet; in China, white; in Egypt, yellow.

Mouse (plur. Mice), name of the house mouse (*Mus musculus*), popularly applied to many species of small rodents, chiefly of the family *Muridae*, although a few belong to related families. Such are the jumping mice (*Zapus*) of the family *Zapodidae*, the pocket mice (*Perognathus*), belonging to the *Dipodidae*, and the dormice (*Myoxus*), forming the family *Myoxidae*. The field mice, or voles, belong to the genus *Arvicola*, which includes many species and has representatives in both the Old and New Worlds. The white-footed or deer mice belong to the genus *Hesperomys*,

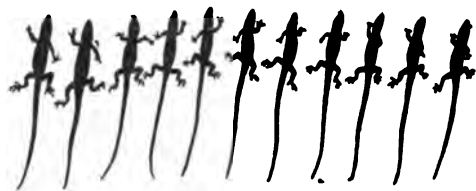
which is exclusively American. The house mouse is a native of the Old World, but, like the rat, has been unintentionally introduced



HOUSE MOUSE.

by man throughout nearly the whole world, and its amazing fecundity enables it to hold out against many enemies, including the rat. See RODENTIA.

Mov'ing Pic'tures, pictures produced by the vitascope, an instrument for projecting a rapid succession of pictures in such manner as to cause the illusion of motion due to life. In its simpler forms this instrument has long been known. Its present perfection is an outcome of development in photography and electricity. The physiological principle on which it depends is that a definite interval of time is required for the perception of a nerve impression; and, however quick this impression may be, time is required for the perception to vanish. The most obvious illustration of this is that a blow upon the body produces the sensation of pain which may last for hours. About the middle of the nineteenth century Helmholtz measured the velocity of a nervous impression, and found it to be less than 100 ft. per second. Long ago it was observed that the apparent form of a body is modified if its condition be changed from that of rest to rapid motion. The spokes of a rapidly revolving wheel when seen by con-



LIZARD WALKING. (After Marey.)

tinuous light are practically invisible, but if the wheel be revolved at the highest speed in the dark, and momentarily illuminated by a single spark from an electric coil, every spoke is plainly visible. Upon this principle an instrument called the stroboscope was invented in 1832. It consisted of a disk through which a series of equidistant narrow radial openings were cut near the circumference. If a moving body, such as a revolving wheel, be viewed through the slits of the stroboscope disk, the eye receives a succession of nearly instantane-



MOVING PICTURES.

SECTION OF A PHOTOGRAPHIC FILM.



ous views like those due to the electric spark. The duration of a luminous impression on the retina varies, under ordinary conditions of illumination, from one tenth to one fiftieth of a second.

For good stroboscopic effects the object viewed must be brilliantly illuminated, and the interval of time between two successive passages of a slit before the eye must not exceed one fiftieth of a second. If these two conditions are fulfilled, the visual impression is continuous and the illusion of motion is controllable. The forms and names which have been given to this instrument are numerous. Instead of employing a disk, it is easy to substitute a vertical hollow cylinder, pivoted axially and slitted in a direction parallel to the axis. Upon a strip of paper, whose length is equal to the circumference of the cylinder, pictures are constructed representing successive phases in the motion of a living object. This strip is fixed against the inner wall of the cylinder just beneath the slits, the number of pictures being slightly greater or less than the number of slits. The cylinder is made to spin upon its axis while the observer looks at the revolving strip through the slits which pass in front of his eyes. Whether the visual impression is sensibly continuous or perceptibly interrupted depends upon the speed of rotation, but the partial blending of successive impressions produces strikingly the illusion of motion. The names zoetrope and phenakistoscope have been popularly applied to this form of stroboscope.

Prior to 1880 all pictures intended for the zoetrope were made by hand, and the accurate reproduction of the successive phases of rapid motion was quite impossible. A revolution in this art has been created by the rapid development of instantaneous photography. By the use of sensitive films of gelatin bromide of silver emulsion the time required for the action of ordinary daylight in producing a photograph has been reduced to a very small fraction of a second. Edward Muybridge in California first utilized these films for the photographic analysis of animal motion. A battery of cameras was arranged beside a race track, each camera being provided with a spring shutter, which was controlled by a thread stretched across the track. A running horse thus broke each thread at the moment when he passed in front of the camera, and twenty or thirty pictures of him were taken in close succession within one or two seconds of time. From the negatives thus secured a series of positives could be readily obtained in proper order on a strip of sensitized paper. Such a strip when examined by means of the zoetrope furnished a reproduction of the horse's motion superior to anything previously attained.

Muybridge devised an instrument which he called a zoopraxiscope for the optical projection of his zoetrope photographs. The succession of positives was arranged in proper order upon a glass disk about 15 or 18 in. in diameter near its circumference. This disk was mounted conveniently for rapid revolution so that each picture should pass in front of the condenser of an optical lantern.

But the difficulties involved in the preparation of the disk pictures and in the manipulation of the zoopraxiscope prevented this instrument from attracting much notice. Artistically it was the forerunner of the instruments known as kinetograph, vitascope, cinematograph, etc.

In 1887, when Thomas A. Edison was busied with the work of improving the phonograph, he conceived the idea of associating with the phonograph an instrument embodying the principle of the stroboscope, so that the reproduction of articulate sounds should be accompanied by the reproduction of the motion naturally associated with them. It was not until 1893 that his conception was successfully realized in the instrument which he named the kinetoscope. Instead of employing a battery of cameras as Muybridge had done, Edison devised a special form of camera in which a long strip of sensitized film should be moved rapidly behind a lens, this being provided with a shutter so arranged as to alternately admit and cut off the light from the moving object. The mechanism is so adjusted that forty-six exposures per second are given, the film being stationary during the minute period of exposure, then quickly carried on far enough to bring a new surface of film into the proper position. The interval required for this shifting is about one tenth of that allowed for exposure, so that the actual time of exposure is almost exactly one fiftieth of a second. The average speed with which the film moves, including both shiftings and stoppages for exposure, is rather more than 1 ft. per second, so that a length of film of about 50 ft. receives between 700 and 800 successive impressions during its circuit of forty seconds.

After this series of negatives has been developed, the strip may be used as a transparency for the purpose of securing a corresponding series of positives. By means of an electric motor the strip of positives is made to move just as it did in the camera.

To use the kinetoscope film for projection so as to be visible to an audience, a source of intense light is found in the electric focusing lamp. At or near the focal point of the projecting lantern condenser the film is made to travel across the field just as in the kinetoscope. A water cell in front of the condenser absorbs most of the heat and transmits most of the light from the arc lamp, and the small picture thus highly illuminated is protected from injury. A projecting lens of rather short focus throws a large image of each picture on the screen, and the rapid succession of these completes the illusion of lifelike motion.

The projecting apparatus just described has received the name "vitascope," a word of mixed Latin and Greek derivation which is not worthy of commendation. "Projecting kinetoscope" would be a less objectionable name. The "cinematograph," a French instrument by Lumière, differs from it only in matters of detail. The same remark applies to the "chronophotographic" projection apparatus of M. Demeny, of Paris. The combination of kinetoscope and phonograph has received the name of kinetophone. See CHRONOPHOTOGRAPHY.

Mowat (mow'at), Sir Oliver, 1820-1903; Canadian statesman; b. Kingston, Ontario; called to the bar, 1841; appointed a queen's counsel, 1856; commissioner for consolidating the public general statutes for Canada and Upper Canada, respectively, 1856; member of the Quebec Union Conference, 1864; president of the Evangelical Alliance of Ontario, 1867-89, and of the Canadian Institute, Toronto. He was Provincial Secretary, 1858; Postmaster General, 1863-64; Vice Chancellor of Upper Canada, 1864-72; Premier and Attorney-General of Ontario, 1872-96; became Minister of Justice of the Dominion; then appointed Lieutenant Governor of Ontario, 1897; knighted, 1892.

Mow'ing Machines. See REAPING AND MOWING MACHINES.

Mox'a, form of the actual cautery whose use was derived from the Japanese and Chinese through the Portuguese. The down from the leaves of *Artemisia moxa*, the pith of the sunflower, cotton or lint soaked in solution of saltpeter and then dried, a pledget of spider's web, or a lump of madou is rolled into a little cone and placed on the part which it is desired to cauterize. It is then set on fire and held in place by a hairpin or an instrument called a porte-moxa. The neighboring parts are covered by wet lint. There is no advantage over the hot iron in this method, and it is more painful.

Mozambique (mō-zām-bēk'), former Portuguese province on the E. coast of Africa; now a district of Portuguese E. Africa.

Mozambique, capital and one of the chief ports of district of same name in Portuguese E. Africa; on a small coral island near the mouth of a bay 6 m. long and 5 broad; is defended by several forts; has a good harbor; exports rice, gum, gold dust, ebony, tortoise shell, and timber. Pop. of island (1901) abt. 6,000.

Mozambique Chan'nel, strait between the E. coast of Africa and the island of Madagascar; about 1,000 m. long and between 500 and 600 m. at its entrances, and nearly 300 m. in the middle. The Comoro islands are at its N. outlet.

Mozart (mō'tsärt), Johann Georg Leopold, 1719-87; German composer; father of Wolfgang Amadeus Mozart; b. Augsburg; was chapelmaster to the Archbishop of Salzburg. His great "violin school" is considered the first theoretical and practical method for that instrument ever published.

Mozart, Wolfgang Amadeus, also JEAN CHRYSOSTOME THEOPHILE SIGISMUND, 1756-91; German composer; b. Salzburg; son of the preceding; at the age of four played the violin with expression, and composed minuets and simple pieces; during his childhood accompanied his father on concert tours and composed most of the symphonies which were played. The family resided in England, 1764-66, where the son became acquainted with the works of Handel, and thereafter made those

and the works of Bach his classical models; he also studied the best Italian masters. In 1767 father and son went to Vienna, and were received at court, but the jealousy of the Italian court musicians led them to leave Austria for Italy. While in Rome, Wolfgang wrote from memory, after hearing it but once, the Easter music performed in the Sistine Chapel; at Milan his opera, "Mitridate," was performed and repeated twenty times. On his return, 1771, he was appointed court organist to the Archbishop of Salzburg; 1777-79, resided in Paris; 1780, was called to Munich by Prince Charles Theodore to write the opera, "Idomeneo," which earned him more than his usual praises; 1781, left the service of the archbishop, who had treated him as a menial, and settled in Vienna; 1782, married Constance Weber, a pianist. The "Abduction from the Seraglio," an opera ordered by Joseph II, brought him the office of court composer. The opera, "The Marriage of Figaro," written in six weeks, 1786, had great success throughout Europe, as had "Don Giovanni," written for the people of Prague, 1787. In 1791 he wrote the "Requiem"; also the operas, "The Magic Flute" and "The Clemency of Titus." Mozart is considered the greatest composer of the world from the combined versatility and power of his genius. He wrote 628 published works and 294 compositions, either unfinished or unpublished.

Mucilage, a name applied in the arts to solutions of vegetable gums in water, or to other soluble preparations possessing adhesive qualities. The best mucilage is prepared by dissolving gum arabic in water in closed copper boilers surrounded by steam jackets, the temperature of the water being raised to and kept at the boiling point by superheated steam until the solution is effected, the process being hastened and facilitated by brass agitators run by machinery. The hot solution is drawn off, filtered under pressure through cloth, to remove the dirt and other foreign matter contained in the gum; oil of cloves or some other suitable antiseptic is added to prevent fermentation and the growth of mold, which impair the adhesive properties of mucilage, and the solution is allowed to stand for some time until such impurities as were not removed on the cloth filter have settled out, when it is bottled.

One of the most common substitutes for gum arabic is dextrin. The objectionable brown color of its solution can be removed by filtering through animal charcoal, but its adhesive properties, as indicated by its viscosity, are only equal to those of a third-rate gum arabic. It is used to form the adhesive surface of postage stamps, labels, and envelopes. Fish glue is also much used on labels, and dilute solutions of this material are widely sold as mucilage, and are, except for the characteristic and disagreeable odor and taste, a satisfactory substitute for the gum-arabic mucilage. Other gums are also largely imported for the uses to which gum arabic was almost exclusively used. Of these the principal ones are the other African gums from Senegal and the Cape, and the Ghatti gums from India. See GLUE; PASTE.

Mucoraceæ, family of fungi, popularly known as Molds or Black Molds. The species of this



VARIOUS SPECIES OF MUCORACEÆ.

order are very widely distributed, and among them are many fungi known as common molds. They frequent articles of food, excrement of animals, and, in short, are found on nearly all decaying animal and vegetable matter. One species, *Phycomyces nitens*, grows on oily substances, an unusual habitat of fungi. As a rule, the members of this order are quite small, although *P. nitens* has been known to attain the height of a foot. The mycelium, which is often found in large masses in some of the commoner molds of this group, frequently presents a shiny appearance, whence the common German word for plants of this order, Schimmel, glitter, is derived. As species of this family conform tolerably closely to the type, *Mucor mucedo*, a common mold growing on dung and other substances, may be regarded as an illustration of the whole order. See FUNGI.

Mucous Membrane, lining membrane of the alimentary, respiratory, and genito-urinary tracts. Anatomically, it consists of the mucous membrane proper and the submucous tissues. The first is composed of the secretory tubules, follicles, and glands, situated on a basement or liminary membrane; the second consists of connective or "areolar" tissue with some elastic fibers, and contains the capillary blood vessels and nerve filaments by which the secretory surface is nourished and vitalized. The functions of mucous surfaces differ very greatly with the situation. In the nose, the function is merely the heating of the air of respiration; in the œsophagus and lower urinary tract the mucous surface acts as a protective surface, offering no obstacle to the ready passage of the substances normal to the parts in question. In the stomach, intestines, and in certain other situations the mucous membrane secretes complex substances of the greatest importance in physiological processes, and by its corrugated structure, numerous reduplications, and villous processes it affords an extensive surface for the great functional processes of nutritive absorption and the elimination of effete excretory

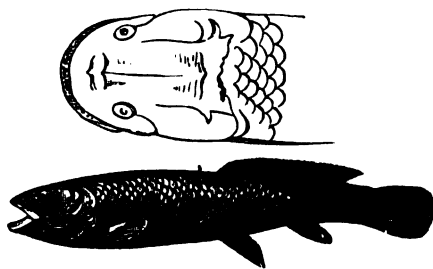
products. It is the common property of all mucous membranes to secrete a viscid liquid called mucus, which acts as a lubricant and protective. This consists of water combined with a small quantity of the mineral salts, and a peculiar variety of organic matter termed mucosine, which gives it its viscosity. Inflammation of mucous surfaces is called catarrh, and is usually accompanied by an increased secretion of mucus.

MUCOR
MUCEDO.

Mudar (mūd'ār), or **Madār**, large plant of the E. Indies, *Calotropis asclepias gigantea*, now naturalized in the W. Indies. Its fiber is used for making cloth and cordage, and the bark of its root is employed

with apparent advantage in leprosy, elephantiasis, syphilis, and other diseases.

Mud'fish, genus of American ganoids; found in the great N. lakes, S. to Carolina, and W.



WESTERN MUDFISH.

to the Mississippi; it is the bowfin of Lake Champlain, the dogfish of Lake Erie, and the marsh fish of the Canadians.

Mud Hen. See COOT.

Mud Pup'py, or **Wa'ter Dog**, batrachian of the order *Amphipneusta*, found in the fresh waters of the E. parts of the U. S., especially abundant in the Great Lake system. It has the head and mouth large, the upper jaw and palate thickly set with small sharp teeth, a short neck, four limbs, each having four toes without nails; small eyes, without lids; thick and fleshy lips, a large tongue, immovable except at the tip and edges; smooth skin, and is able to support life out of water for several hours. It reaches a length of about a foot.

Muezzin (mū-ēz'zīn), Arab, *mu'eddsin*, "caller," "proclaimer"; officer of a mosque who, from the balcony of a minaret, calls the faithful to prayer, as prescribed in the Koran, at dawn, near noon, in the afternoon, a little after sunset, and at nightfall. He repeats the call during the night for those who wish to perform extra devotions, adding: "Prayer is better than sleep."

Muf'ti (Arab., "expounder"), called also **SHEKH-UL-ISLAM**, highest Ottoman ecclesiastical functionary, representative of the sultan in religious affairs, as is the grand vizier in temporal matters. His chief duty is to expound Mussulman religion and law. Though appointed and removable like any officer of state, he while in power exercises a peculiar and anomalous influence upon the throne. No Ottoman sultan was ever deposed until after the mufti had issued a *fatva* (official opinion) against him; such a *fatva* once issued, it would be very difficult, if not impossible, for the sovereign to retain his place.

Muhammad (mô-hâm'mâd) **Shams ed-din**. See **HAFIZ**.

Mühlbach (mül'bäch), **Louise**. See **MUNDT**, **KLARA**.

Mühlberg (mül'berg), town in the province of Saxony; on the Elbe, 36 m. SE. of Wittenberg; famous on account of the battle fought here, April 24, 1547, in which the army of the allied Protestant princes under Johann Friedrich was totally defeated by the imperial army, and which changed entirely the course of the Reformation. Pop. (1900) 3,463.

Muhlenberg (mü'lén-berg), **Frederick Augustus**, 1750-1801; American clergyman; b. Trappe, Pa.; son of Heinrich Melchior Muhlenberg; held important Lutheran pastorates in Pennsylvania and in New York City; was in Congress from Pennsylvania, 1779-80 and 1789-97, and was twice Speaker of the House; held also important state and Federal offices.

Mühlenberg, **Heinrich Melchior**, 1711-87; founder of the Lutheran Church in America; b. Eimbeck, Hanover; entered the Lutheran ministry; was an instructor at Francke's Orphan House, and, 1742, was sent as a missionary to America; was stationed first at Philadelphia, and afterwards at the Trappe, Montgomery Co., Pa.; traveled extensively; founded the Lutheran Ministerium of Pennsylvania, the first in America.

Muhlenberg, **Peter John Gabriel**, 1746-1807; American soldier and legislator; b. Trappe, Pa.; son of the preceding; was pastor at Woodstock, Va.; formed a regiment among his parishioners; was made brigadier general, 1777, and major general at the close of the Revolution; became vice president of Pennsylvania, 1785, and was a member of Congress, 1789-91, 1793-95, and 1799-1801.

Muhlenberg, **William Augustus**, 1796-1877; American clergyman and hymnologist; b. Philadelphia; great-grandson of Heinrich Melchior Muhlenberg; became rector of St. James's (Protestant Episcopal) Church, Lancaster, Pa., 1821; founded, 1828, a school at Flushing, L. I., and for nearly twenty years was its principal; 1846, became rector of the Church of the Holy Communion, New York; 1858, first pastor and superintendent of St. Luke's Hospital, founded through his efforts; 1845, organized the first Protestant sisterhood in the U. S. He was the author of the hymn, "I Would Not Live Away," and of other poems, and published

"Church Poetry," "Music of the Church," in conjunction with Bishop Wainwright, and "The People's Psalter."

Mühlhausen (mül-how'zén), town of Prussia; province of Saxony; on the Unstrut; 25 m. NNW. of Gotha; has large manufactures of woolen and cotton goods, furniture, hosiery, leather, sewing machines, etc. It is surrounded by walls, and originally was a free city of the empire. In the Peasants' War of 1525 it was the headquarters of Thomas Münzer, and also the scene of his execution. Pop. (1900) 33,428.

Muir, **John**, 1838-1914; American naturalist; b. Dunbar, Scotland; came to the U. S., 1850, and settled near the Fox River in Wisconsin; made a botanizing tour through the S. states, Cuba, and California, settling in the latter place, 1868. In 1876 he joined a party connected with the geodetic survey of the great Basin, and, 1879, made a tour of exploration in Alaska, where he discovered the great glacier named after him. He was one of the first to make known the beauties of the Yosemite. He published "The Mountains of California," "Our National Parks," and many magazine articles.

Muk'den, capital of Manchuria and of the province of Liao-tung or Shingking; about 100 m. N. of Newchwang, its port on the Gulf of Liao-tung, and 400 m. NE. of Peking; is in a comparatively treeless plain; is surrounded by a wall, with an inner one inclosing the official buildings, and was the residence of the Manchu sovereigns. On October 8, 1903, the day on which Russia had agreed to evacuate Manchuria, U. S. Minister Conger signed a commercial treaty in Peking, in which China guaranteed that Mukden should be an open port. In the Russo-Japanese War the Russians made the city a place of great military strength; but after the Japanese had pursued the Russians, on their inability to relieve Port Arthur, and defeated them at Liao-yang, and in a ten days' series of battles in the suburbs and at the city (February-March, 1905), the Russians evacuated their works here and continued their retreat toward Tie Pass. Pop. abt. 158,000.

Mul'berry, name of trees and fruits of the genus *Morus*, now generally referred to the *Urticaceae* or elm family. The genus comprises a few species of Asiatic and N. American trees, mostly of small size and short trunk. The leaves are mostly large and ovate, alternate upon the stem, and are variously toothed and lobed, although not compound. A remarkable feature of mulberry foliage is its variability, leaves on the same tree often differing widely in shape. The sexes are borne on different plants in some cases, and on different catkins on the same plant (*monœcious*) in others. The mulberry is chiefly known through its use as a food plant for the silkworm. For this purpose it has been grown from the earliest times, particularly in China. In the U. S. the mulberry is chiefly known as a fruit-bearing tree, and even in this capacity it is nowhere largely grown. The fruit resembles a blackberry in form and size, although more slender, and the flavor is sweet and in some varieties

slightly vinous. It is sometimes served in restaurants at the end of the blackberry season. Although the two commonest species of



BLACK MULBERRY.

mulberry are known as the white and the black, the color of the fruit does not afford characteristic differences between them.

Mule, name in its widest sense synonymous with hybrid, but more commonly denoting the offspring of the male domestic ass and the mare; the corresponding offspring of the male horse and female ass is the jennet or hinny. The mule is more difficult to breed than the horse and matures more slowly, but its working life is longer and it is less liable to disease. The male is sterile, and although the female sometimes can be impregnated by the horse or ass, she rarely brings forth offspring alive. The mule is a hardy, strong, sure-footed, serviceable animal, peculiarly adapted to hard work in hot weather, and to use on steep and rough roads. Mules are used in nearly all parts of the world, especially in N. and S. America, Spain, S. France, Italy, and the East. In Spain, Spanish America, and parts of Africa and the East, mules are highly prized as saddle animals. For military transport purposes they are decidedly superior to horses and much more used. See **Ass**.

Mulgrave, Constantine John Phipps (Lord), 1734-92; English explorer; became post captain, 1765; commanded an exploring expedition in search of a NW. passage, 1773; reached lat. 80° 48' N.; published "A Journal of a Voyage Toward the North Pole"; was raised to the peerage, 1784.

Mulhall, Michael George, 1836-1900; British statistician; b. Dublin, Ireland; works include "The Progress of the World in Arts, etc., since the Beginning of the Nineteenth Century," 1880; "The Balance Sheet of the World, 1870-80," 1880; "A Dictionary of Statistics," 1883; "History of Prices since the Year 1850," 1885; "Fifty Years of National Progress, 1837-87," 1887; and "Industries and Wealth of Nations," 1896.

Mülhausen (mül-how'zén), town of Germany; in Alsace-Lorraine; on the Ill, which divides it into the old and the new city; 61 m. SSW. of Strassburg. The old town is rather indifferently built; the new town is very elegant. There is, besides, a workingmen's quarter of 1,000 well-built houses. Mülhausen has manufactures of cotton, woollens, linens, muslins, watered silks, chemicals, printing and dye works, etc., and is one of the most flourishing manufacturing towns of Germany. The town and its territory originally belonged to the Swiss Confederation, but, 1798, was incorporated with France, and by the Treaty of Frankfort, 1871, ceded to Germany. Pop. (1905) 94,498.

Mull, one of the Inner Hebrides; off the W. coast of Scotland; 30 m. long and 25 m. broad; high, rugged, but fertile; cattle and sheep are reared.

Mullein (mül'lin), common name of a plant of the figwort family (*Verbascum thapsus*), belonging to a widely distributed genus which includes more than eighty varieties. The com-



COMMON MULLEIN.

mon mullein of the U. S. is biennial, attaining a height of from 4 to 6 ft., with oblong-acute leaves, 8 or 10 in. long, with a soft, wool-like covering. It is found in Europe and Asia, whence it was introduced into N. America, where it is a troublesome weed.

Müller (mü-lär'), Charles Louis, 1815-92; French historical and portrait painter; b. Paris; is best known by his celebrated "Roll Call of the Last Victims of the Reign of Terror," and "Charlotte Corday in Prison" (in the Corcoran Gallery, Washington).

Müller (mü'lér), Frederick Max, 1823-1900; German philologist; b. Dessau; went to England, 1846; became Prof. of Modern Languages and Literature at Oxford, 1854, and of Comparative Philology, 1868; was connected with the Bodleian Library after 1856, and was curator of Oriental works, 1865-67. His more important works include "Rig-Veda Samhita Translated and Explained"; second edition, "Sacred Books of the East," "Hitopadesa, Text, Gram-

mar, Analysis, and English Translation"; "Upanishads, Translated from the Sanskrit"; "Sacred Books of the East," "Buddhist Texts from Japan," "History of Ancient Sanskrit Literature," "On the Origin and Growth of Religion," "Lectures on the Science of Language," "Chips from a German Workshop," "National Religion."

Müller, Friedrich, called **PAINTER MÜLLER**, 1749-1825; German poet; b. Kreuznach; was an artist by profession; aided by Goethe and others, settled in Rome, 1778, but lost his interest in art and supported himself finally as a guide and second-hand bookseller. His works include "Idylls," "Niobe," an opera; "Golo and Genevieve," a drama; "Faust," a drama.

Müller, Georg Friedrich, commonly called **GEORGE MÜLLER**, 1805-98; German philanthropist; b. Kroppenstädt, Prussia; entered the Univ. of Halle, 1825, to study for the ministry, and here determined to become a missionary. In 1830 he allied himself to the Plymouth Brethren, and became minister of one of their chapels, but very soon gave up his salary and depended solely upon the voluntary gifts of his congregation and others. He believed that God would, on request, supply his wants, and he lived on this principle the rest of his life. In 1832 he went to Bristol and founded the Scriptural Knowledge Institution for Home and Abroad, its object being to assist and establish Sunday schools. In 1835 he opened an Orphanage for Girls, and by 1870 had five houses filled, the money having been raised without direct appeals. It is said the amount of money received was £1,424,646. Between 1875 and 1892 he made seventeen tours to widely separated parts of the world, and made many addresses. His expenses were all paid by voluntary gifts.

Müller, Johann Friedrich Wilhelm, 1782-1816; German engraver; son of Johann Gotthard Müller; b. Stuttgart; was professor at the academy in Dresden. His engraving after the statue "La Jeunesse" attracted great attention by the manner in which he undertook to imitate marble, but his most celebrated works are the engraving of the "Madonna di S. Sisto," by Raphael, and the portraits of Jacobi and Schiller, after the busts by Dannecker.

Müller, Johann Gotthard von, 1747-1830; German engraver; b. Bernhausen, near Stuttgart; went, 1770, to Paris, where he studied engraving under Wille, and was appointed professor, 1776, at the Academy of Art at Stuttgart, where he exercised a great influence. Among the most celebrated engravings by him are "The Battle of Bunker Hill," by Trumbull; "St. Cecilia," after Domenichino; "St. Catharine," after Leonardo da Vinci; and the portraits of Louis XVI, Dalberg, and Jerome Bonaparte.

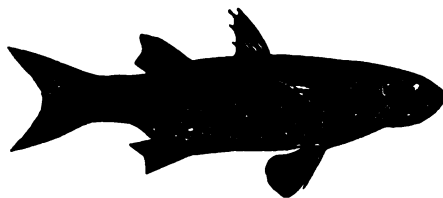
Müller, Johannes, 1801-58; German physiologist; b. Coblenz; became Prof. of Physiology and Anatomy, 1826, at Bonn, and, 1833, at Berlin, where he died. As the founder of the physico-chemical school of physiology he

enjoyed the fame of being one of the greatest physiologists of his age. His principal works are "Elements of Physiology," "De Respiratione Foetus," "De Glandularum Secernentium Structura," "Vergleichende Anatomie der Myxinoiden."

Müller, Wilhelm, 1794-1827; German poet; b. Dessau; fought as a volunteer in the wars of liberation against Napoleon; became, 1819, professor at the Gymnasium of Dessau and librarian of the duke's library at that place. His works include "Songs of the Greeks," "Songs of Life and Love," "Lyrical Promenades," "Poems of a Bugle Player." Many of his lyrics were set to music by Schubert and other great composers. He also published the "Library of the German Poets of the Seventeenth Century."

Müller, Wolfgang, called **VON KÖNIGSWINTER**, 1816-73; German poet; b. Königswinter, Prussia; was originally a physician, and, 1848, entered the Frankfort Parliament; lived at Düsseldorf, Cologne, and Wiesbaden. Author of charming epic poems, including "The May Queen," "Prince Minnewin," "Cinderella"; of dramatic pieces, including "She Has Uncovered Her Heart"; also of "Legends of the Rhine in Ballad Form"; and of the prose works "Düsseldorf Artists" and "Munich Sketch Book." The collection "Verses of a Rhine Poet" contains some of his best work.

Mullet, name common to the fishes of the family *Mugilidae* (group *Percesoces*), and often



STRIPED MULLET.

extended to the very different family *Mullidae* or surmullets and to other fishes. Of the true mullets of the American Atlantic and Gulf waters, the striped mullet (*Mugil cephalus*) and the white mullet (*M. curema*) are small but esteemed food fishes. The mullets were greatly prized by Roman epicures; Pliny states that \$300 was paid for one fish. They were rarely more than 6 in. long, and were trained to come when called by their owners.

Mullion (mŭl'yŭn), in architecture, a vertical bar or slender pillar dividing a window into two or more parts. In Gothic tracery the earliest mullions seem to have been slender columns, sometimes single and sometimes clustered. In the Geometric, Decorated,



MULLION.

or Rayormant period (fourteenth century) these columnar mullions were of extraordinary slenderness and height; they soon, however, gave way to bar mullions, mere slender bars molded to the profiles of the moldings of the arched heads of each division or light of the window. In the enormous windows of the English Perpendicular period the mullions were intersected by frequent horizontal bars or *transoms*.

Mu'lock, Dinah Maria. See **CRAIK**.

Mul'ready, William, 1786-1863; Irish landscape and genre painter; b. Ennis, County Clare; elected Royal Academician, 1816. His illustrations for "The Vicar of Wakefield" are among the best things of their kind in British art, and he painted several pictures from the same subjects; others are "Snow Scene," "Seashore Scene," and "The Bathers."

Multan (möl-tän'), town of British India; in the Punjab; chiefly interesting on account of the surrounding ruins; is of much commercial and manufacturing importance; and its magnificent Hindu temple and the graves of two Mohammedan saints draw many pilgrims from all parts of India. Pop. (1901) 87,394.

Mum'nius, Lucius (surnamed **ACHAÏUS**), Roman consul; was praetor 154 B.C., and became consul 146, in which year he invaded Greece, defeated the army of the Achaean League, and pillaged and burned Corinth as a warning to the other Greek cities.

Mum'my, dead body embalmed, or preserved from decay by drying. The bodies of the dead were preserved by many ancient nations, but the practice was most general among the Egyptians, who embalmed all their dead. After the process was finished, the Egyptians swathed the body with narrow linen bandages steeped in some resinous liquid, probably the gum of the *mimosa Nilotica*. The bandages were sometimes more than 1,000 yards in length. The body was next inclosed in a cartonnage or case made to fit its shape, which was richly painted and gilded, the face being colored to represent the features of the deceased, or overlaid with thick gold leaf, and the eyes made of enamel. The cartonnage was covered with other cases, sometimes three or four, made of cedar or sycamore, similarly painted. It has been estimated that more than 400,000,000 human mummies were made in Egypt from the beginning of the art of embalming until its discontinuance in the seventh century. Vast numbers of sacred animals also were embalmed. See **EMBALMING**.

Mumps (probably derived from verb to *mump*, to mumble, be sulky, in allusion to the appearance of the patient), an infectious and contagious disease, characterized by an acute inflammation with enlargement of the parotid gland. In some localities, especially those with a moist and cold climate, it is very frequently seen (endemic). Children from seven to fourteen years of age, principally males, are most liable; adults, however, are not exempt. Its incubation lasts from one to three weeks; its chief symptoms are moderate fever; pain on pressure over the affected gland, in front of and below the ear, most frequently the left, some-

times the right, and occasionally both sides; considerable swelling of that region; difficulty in mastication, swallowing, and respiration; change of voice; fullness of the head and dizziness. In some cases the spleen and other glands are also enlarged. Catarrh of the eyes, nose, and mouth is frequent. The disease lasts from a few days to a week. The swelling gradually subsides; in some cases, however, the gland may remain large and hard, and in a few an abscess will form. The treatment is simple, but should be under the guidance of a physician. It consists of regulation of diet—less meat, more milk, gruels, fruit, etc.; vegetable acids (lemonade), or dilute hydrochloric acid, 10 to 15 drops in a tumblerful of water as a beverage; mild purgatives. Locally, it is best to use cold applications, reserving warm water or poultices for those cases in which an abscess is forming. In case of abscess, incision, free drainage, and antiseptic treatment are indicated.

Munch (mönch), Andreas, 1811-84; Norwegian poet; b. Christiania; edited a newspaper, 1841-46; became, 1850, assistant librarian of the university library; appointed, 1860, extraordinary lecturer in the university without obligation of lecturing; spent most of his time abroad, and after 1866 lived in Copenhagen. His works include "Grief and Consolation," a collection of poems; "Lord William Russell," a tragedy; "The Princess's Bridal Journey," twelve romanzas; "The Maid of Norway," a romance; "The Picture of Jesus," a cycle of poems. His romance "The Bridal Procession in Hardanger" is one of the most popular of Norwegian songs.

Munch, Peter Andreas, 1810-63; Norwegian historian; b. Christiania; was one of the founders of the modern Norwegian historical school; became Associate Prof. of History at the University of Christiania, 1837, and professor, 1841; lived in Rome, 1858-61, studying the papal archives. He published many works of a linguistic nature; translated and edited several old Norse sagas; wrote "History of the Norwegian People," etc.

Münch-Bellinghausen (münch-bēl'ing-how-zén), Eligius Franz Joseph (Baron von), 1806-71; Austrian dramatist; b. Cracow; held government offices in Vienna at the Imperial Library, the Burgtheater, etc.; is best known in German literature by his pen name of "Friedrich Halm." As a dramatist, he belongs to the school of Schiller. His works include "Griseldis," "The Adept," "Camoens," "The Son of the Wilderness," played in English as "Ingo the Barbarian"; "The King and the Peasant," "The Gladiator from Ravenna," his best drama. He also wrote some lyrical poems of inferior quality.

Münchhausen (German, münch'how-zén), or **Munchausen** (English, mün-chá'sén), **Hieronymus Karl Friedrich** (Baron von), romancer; b. of noble family at Bodenwerder, Hanover; served in the Russian cavalry against the Turks, 1737-39. The baron was throughout life accustomed to entertain his friends with wonderful tales of his exploits in the wars, and had the reputation of being the greatest liar in

Germany. The first published collection of his stories appeared in English, and was written by Rudolph Erich Raspe, a German exile, and published in 1786 in Oxford under the title "Baron Munchhausen's Narrative of His Marvelous Travels and Campaigns in Russia."

Muncie (mŭn'si), capital of Delaware Co., Ind.; on the White River; 54 m. E. of Indianapolis; in an agricultural region; has manufactures of glass, nails, iron, steel, handles, pulp, and paper; is in the center of the great Indiana natural-gas belt. Pop. (1910) 24,005.

Mundé (mŭn'dā), Paul Fortunatus, 1846-1902; American gynecologist; b. Dresden, Saxony; was brought to the U. S., 1849; was volunteer assistant surgeon in the war between Prussia and Austria, 1866; resident physician in the Würzburg Maternity Hospital and assistant to Scanzoni, 1867-70; surgeon in the Bavarian army during the Franco-German War, 1870; settled in New York, 1872; was Prof. of Gynecology, New York Polyclinic, and gynecologist to several New York hospitals; editor of *The American Journal of Obstetrics*, 1874-92; published "Minor Surgical Gynecology"; edited the sixth edition of Thomas's "Diseases of Women."

Mundell'a, Anthony John, 1825-97; British statesman; b. Leicester, of Italian ancestry; organized the first courts of arbitration for the settlement of trade disputes, 1859; entered Parliament as a Liberal, 1863; was vice president of the Council on Education and Charity Commissioner, 1880-85; president of the Board of Trade in the Gladstone Ministry, 1886 and 1892.

Mundt (mŏnt), **Klara** (MÜLLER), 1814-73; German novelist; b. Neubrandenburg; married Theodore Mundt, critic and biographer; under pen name of "Luise Mühlbach" wrote nearly 100 historical novels, those relating to Frederick the Great, Marie Antoinette, and the Bonaparte family being especially well known in the U. S. Other works, "The Thirty Years' War," "The Emperor William," and "From Königgratz to Chiselhurst."

Mungo (mŭn'gō), or **Ken'tigern**, Saint, 518-603; Scottish missionary; b. Culross, on the Forth; son of a British prince; was the apostle of Christianity to the Welsh or British races between the Clyde and the N. boundaries of Cumberland; died at a monastery he had founded on the site of the cathedral of the modern Glasgow.

Mun'goos, carnivorous mammal of India (*Herpestes griseus*) belonging to the family *Viverridae*, and related to the African ichneumon; is about the size of a cat, but is lower and longer bodied; tail long, hair harsh, of a gray color, with blackish markings. In India the mungoos is domesticated and kept about houses to free them of rats, and, above all, to kill serpents.

Mŭng-Tse', or **Mēng-Tse'**. See **MENCIUS**.

Munich (mŭ'nĭk), German, **MÜNCHEN**, capital of Bavaria; on the Isar, here crossed by three bridges; is well laid out, and has broad streets

and many large public squares. The city proper is on the left bank of the river, only some suburbs extend along the right bank. In architectural respects it is the most beautiful and interesting city in Germany, and one of the richest in sculptures and paintings. Of the various gates the Siegesthor (Gate of Victory) and the Propylæum are especially remarkable. Nearly in the center of the city, on the Max Joseph Place, is the royal palace, consisting of three parts—the king's house, the banqueting house, and the old residence. The palace is connected by a winter garden with the theater, which has seats for 2,500 persons. On the other side of the palace is the royal garden, surrounded on two sides by arcades, which are connected with the banqueting house. Among the public buildings are the so-called Generals' Hall, the New Rathaus, or Town Hall; palaces of the Duke of Leuchtenberg and of Duke Max, Ministry of War, library, with more than 950,000 volumes; Odeon; university, with 5,943 students; the seminary, and the Max Joseph School, the three buildings forming a square; the Wittelsbacher Palace; the Glyptothek, containing a large collection of sculptures; the Pinakothek, a famous picture gallery, or series of galleries; the Polytechnicum; the new Pinakothek, which contains pictures by modern artists; the Schwanthaler Museum, Academy of Science and Art, the Hall of Fame, containing the busts of eighty renowned Bavarians, and fronted by a colossal figure of "Bavaria," 66 ft. high.

The principal churches are the Frauenkirche, Gothic in style, built in the fifteenth century; the metropolitan church of the Archbishop of München-Freising, St. Michael's Hofkirche, built in the latter part of the sixteenth century, Roman Renaissance style; the Auerkirche, in Gothic style, with beautifully painted windows; the Basilica des heiligen Bonifacius, with sixty-six columns, beautiful frescoes, and thirty-four medallion portraits of popes. Here is the tomb of Ludwig I (Ludwigskirche). Over the portal stand Christ and the apostles, by Schwanthaler; the interior contains beautiful frescoes by Cornelius and his disciples. The Allerheiligenkirche or Neu Hofkapelle, E. of the royal palace, in Byzantine style, is a very elegant structure. The Theatiner Church, built 1661-75, contains the equestrian statue of the Elector Maximilian I, by Thorwaldsen. The Protestantische Kirche was built 1827-32. The Academy of Fine Arts, comprising three divisions—architecture, sculpture, and painting—attracts steadily a great number of students. The same is the case with the Conservatory of Music. The manufacturing industry includes the bronze foundries, the porcelain manufactures at Nymphenburg, the glass-painting establishments, all founded by the government; also the optical institute founded by Fraunhofer, and manufactures of mathematical instruments, machinery, firearms, cotton, and silver. The breweries are very extensive. Grain is the principal article of commerce.

The city first appears in history in the twelfth century; in 1254 it was fortified, and from Emperor Ludwig of Bavaria it received many privileges. In 1632 Gustavus Adolphus of Sweden

entered it victoriously. The Elector Karl Theodor improved the fortifications at the end of the eighteenth century. In 1800 it was captured by the French. In 1814 King Maximilian I began the rebuilding and beautifying, which were continued by Ludwig I and Maximilian II. Pop. (1910) 595,053.

Municipal Assessments, burdens placed on lands or property for benefit coming immediately and especially from local improvements, such as the establishment of a park, the grading of a street or thoroughfare, etc. In the U. S. such assessments are nearly always made by the local municipalities, which are authorized to make them by the laws of the state; but there is nothing in the nature of them that prevents their being made by the central government, when it is vested with power to do so. In the U. S. the legality of assessments has been frequently contested as being in violation of the Fourteenth Amendment to the Constitution, but it has been decided by the U. S. Supreme Court that the states have the right to pass laws imposing on persons determined by the Legislature to be benefited the payment of the cost in whole or in part, and providing for a mode of judicially contesting the assessment or charge, and for proper notice, without contravening this amendment.

Municipal Corporations, corporations formed from the members of a city, town, or other community for purposes of local self-government. Among quasi-municipal corporations are embraced such local governmental bodies as counties, towns, and school districts—bodies with extremely narrow powers, and formed generally for the purpose of administering in the localities affairs of general concern and importance. Among municipal corporations are embraced cities and villages which are formed primarily and almost exclusively to administer the affairs affecting the particular districts in which such corporations are found. While almost all governmental districts possessing in any important degree the privileges of local self-government are at the same time municipal corporations, it is to be borne in mind that the incorporation of a place is, or at least was, not originally necessary in order that it possess rights of local self-government. Thus the English boroughs at a very early time received charters which assured to them certain governmental privileges, but they were not incorporated until about the middle of the fifteenth century. The first charter of incorporation in England is said to be that given to Kingston-upon-Hull, granted in 1429. The other divisions of the country, such as the counties and the parishes, did not become corporations until very much later. Indeed, the counties of England did not become incorporated until the passage of the Local Government Act of 1888.

When municipal boroughs were first incorporated, it was not the locality nor the inhabitants that formed the corporations thus created, but the most important individuals, generally members of the governmental body of the borough, i.e., the council, though sometimes the freemen were included. This idea has, with the more democratic character of

municipal government, been abandoned, until now, in both the United Kingdom and the U. S., the corporation formed by the grant to a municipal borough or city of a charter of incorporation is not to be found in the officers or a narrow body of freemen, but in all the inhabitants residing within the municipal district. The original governing body of the municipal borough in both England and the U. S. was the council, in which all powers were centered. As a result, no doubt, of the more important functions which have been conferred by law on municipal corporations in the U. S., there has been felt a need of more clearly defining the responsibility for the administration of city government, and the council has been split up. The judicial functions have generally been assumed by state officers, namely, the judges of the courts, the justices of the peace, and police magistrates. The executive functions have been conferred upon the mayor, who has been separated from and made independent of the council, and by executive officers who have been provided by statute; and the functions of deliberation have been retained by what was left of the council.

Municipal Government, government of cities and towns. The rise of modern industry has not only given an enormous stimulus to the growth of population, but has also tended to mass population in towns and cities. In England and Scotland and in the older parts of the U. S. the town dwellers far outnumber the country dwellers, and in Germany and France the great towns are growing with rapidity, while in the latter the national population as a whole is barely maintaining its volume.

The first great step in Great Britain toward the adaptation of municipal life to the needs of growing communities was the reform of the organization of the town or borough corporations. By the reform acts of 1833-40 these were reconstructed, and municipal government was placed in the hands of the householders; authority is exercised by a common council. Gradually the simple representative city governments of England and Scotland have enormously increased their activities in behalf of the common wants of the population. They have introduced adequate municipal water supplies, and have in many instances established municipal gas and electric works which furnish illumination of streets and public places, and also light to private consumers at reasonable prices. They have constructed drainage and sewer systems, with which the plumbing of all houses is obliged to connect. They have established public abattoirs and suppressed private slaughter houses, have erected produce markets, and brought all food supplies under strict municipal sanitary inspection. They have entered on projects for the demolition of unsanitary tenement houses, have adopted stringent regulations guarding against further imperfect building, and have provided for the prompt suppression of all nuisances, and for the immediate isolation, in municipal epidemic hospitals, of cases of infectious diseases.

Reforms for the convenience of traffic and for the better admission of air and light have been made by reconstruction of street systems

and by the retention of open spaces, and by the acquisition of parks and public pleasure grounds. Public baths have been established, public libraries and reading rooms under municipal auspices have become frequent, as also have public halls and assembly rooms. In many of the English and Scotch cities the street railways are owned by the municipality, and, although it is the common practice to lease them to a private company for operation, Glasgow and several English cities have assumed the direct operation of them. France is divided into communes; the principle of communal government is the same for the smallest country township as for the larger cities. Universal manhood suffrage prevails, and the voters of each commune elect from time to time a certain number of members of the communal or municipal council, the size of which varies according to the population of the commune. The council appoints from its own number the mayor, who in turn selects a certain number of councilors to act as a standing executive committee, each member of which is given the supervision of some department of the municipal administration. This plan of municipal government, with some difference of detail, belongs to all the Latin countries of Europe.

In the government of Prussia and of Prussian municipalities, and in some other parts of Germany, the three-class system, which makes taxation the measure of representation, still prevails. The authority of municipal government is reposed in the *Gemeinderath*, or common council, elected by the body of electors, or *Wahlmänner*. The executive work is performed by a burgomaster, or mayor, and the body of department chiefs, known as the magistrates, all chosen by the common council. The law, treasury, public health, and educational departments, also those of water supply, gas supply, street and paving, architecture and building, care of the poor, property assessment, and various others, are all presided over by some member of the executive magistracy.

It is considered the function of German cities to undertake anything that will promote the well-being of the community, without involving too heavy a burden of taxation. Many of their public utilities are self-supporting. The German towns maintain chemical and bacteriological laboratories, which are constantly testing the character of the water supply, and of the food offered for the consumption of the masses. Street paving and public works are prosecuted with a remarkable thoroughness. Municipal savings banks and pawnshops are maintained to encourage thrift and to lessen the hardship of sudden misfortune, and the municipalities have entered on the policy of insuring workmen against illness, accident, and the peril of an impoverished old age. The providing by the municipality of a kind of education for children which would enable them to enter advantageously into the industrial life of their own community has been carried further in the German cities than anywhere except possibly Paris. Not only is ordinary elementary education universal and compulsory, but the cities provide manual, trade, and commercial instruction.

In the U. S. the development of large towns since the Civil War has led to much scandal in municipal administration. The large cities and towns have shown enterprise in the management of certain departments, such as the water supply, the fire extinguishing service, the provision of common schools, the creation of parks, etc., but the too common policy has been to confer street railway, gas, electric, and other franchises on private companies, and the negotiations between these companies and the municipal bodies have been a source of corruption. The interference of state legislatures in the affairs of the cities has also made impossible any stability of municipal methods. The municipal reform movement has been based chiefly on the principle of local home rule, in order that the people who pay the costs may exercise authority in all matters of detail. The taxes collected for the maintenance of municipal government and local institutions in all civilized countries have grown to formidable proportions; and in the U. S., as well as in some European countries, they constitute much more than half of all the taxation levied. Municipal indebtedness everywhere tends to assume large dimensions; but most of it has resulted from commendable investments in public works which give ample pecuniary return.

During recent years the most conspicuous development in municipal government in the United States has been the rapid spread of the commission system. The plan of entrusting all the affairs of the city to a single small body, combining both legislative and executive functions, was first adopted by Galveston, Texas, after the disastrous flood of 1901. A straight commission form of government requires a commission composed of five elected members, one of whom is called the mayor and acts as chairman, but has no veto power or any other power not shared by the other members of the commission. The commission so elected is the source of all authority in the city, makes all ordinances, appoints all officials, collects taxes, and makes all appropriations. The commissioners are adequately compensated and give their whole time to the city. In many cases the plan involves the exercise by the people of the initiative, referendum and recall. The most effective features claimed for the plan, in addition to the concentration of authority, are the introduction of the principle of the short ballot and the elimination of ward lines. To the end of 1911 commission government had been adopted by over 200 municipalities in 34 states, ranging in population from 130 to 132,000.

Munjeet', commercial name for the root of an E. Indian plant, *Rubia munjista*, or, according to some, *R. cordifolia*, used for the same purposes as madder.

Munjpur', or **Manipur'**, feudatory state of India, between Assam and upper Burma; area, 7,600 sq. m.; pop. (1901) abt. 283,957, mostly in the central valley—that of the river Nankathay, a tributary of the Kyendwen, and hence of the Irawadi; capital, Manipur. It is a very mountainous country; the highest points are in the N. (surpassing 8,000 ft.), and the

heights decrease toward the S. The Kingdom of Manipur was allied to the Indian Govt., 1762, and came under its protectorate, 1826. In 1891 the rajah was deposed by the mountaineers. The chief commissioner of Assam was sent to regulate the matter, when he and his escort and the resident agent were suddenly attacked and killed. More British troops were at once sent, and the chief officers of the rajahship were taken and executed or exiled. Chura Chund, a young relation of the ex-rajah, was placed on the throne and a British officer appointed to administer the state during his minority.

Munk (mōnk), Salomon, 1805-67; French Orientalist; b. of Jewish parents in Prussian Silesia; was educated in Berlin, Bonn, and Paris, and was deputy custodian of the Oriental manuscripts in the Royal Library of Paris, 1840-52. In 1865, though entirely blind, he was appointed Prof. of Hebrew, Chaldaic, and Syriac in the Collège de France. He wrote "Palestine, Description Géographique, Historique et Archéologique" (1845), and published an edition of the "Moreh Nebukhim" of Maimonides with a French translation and notes, and other works.

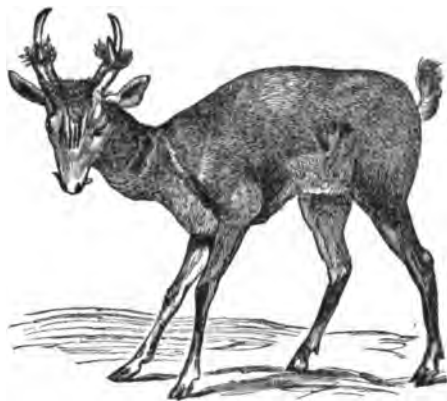
Munkacsy (mōn-käch'ē), Mihály (real name, MICHAEL LIEB), 1846-1900; Hungarian historical and genre painter; b. Munkacs; was a carpenter's apprentice before he studied art; went to Düsseldorf, 1867, and painted there "The Last Day of a Man Condemned to Death," which at once brought him into notice. In 1872 he established himself in Paris. With his picture of "Milton Dictating Paradise Lost to his Daughters" (in the Lenox Library, New York) he entered on a new field, and this work and others exhibited by him at the Paris Exposition of 1878 attracted much attention. "Christ before Pilate" and "Christ on Calvary" are two of his best-known compositions.

Mun'ster, largest of the four provinces of Ireland; bounded N. and E. by Connaught and Leinster, and S. and W. by the Atlantic; area, 9,521 sq. m.; pop. (1911) 1,033,085; is divided into the counties of Cork, Clare, Kerry, Limerick, Tipperary, and Waterford.

Münster, capital of province of Westphalia, Prussia on the Aa; 101 m. N. by E. of Cologne. The most remarkable among its buildings are the cathedral, built 1225-61, and the townhall, in which the Peace of Westphalia was signed, 1648. From the twelfth to the eighteenth century Münster was the capital of an independent principality of the German Empire. In 1719 it was merged into the archbishopric of Cologne, and, 1814, it was given to Prussia by the Congress of Vienna, together with most of its territory. It has many good educational institutions, printing establishments, dye works, and manufactures of leather, woolen, cotton, and silk fabrics, paper, and sugar. Pop. (1905) 81,468.

Munt'jak, Javanese name adopted as the common name of a few species of small deer found in S. and E. Asia and some of the neighboring islands. These little deer stand only

about 2 ft. high at the shoulder. The most common species, *Cervulus aureus*, often called



MUNTJAK.

barking deer, occurs in British India, Burma, Ceylon, Java, Sumatra, etc.

Munychia (mū-nīk'i-ā), name of one of the harbors of Athens, and also of a hill lying between the harbors Zea and Munychia. On the hill there was a temple of Artemis Munychia, in whose honor a festival (also called Munychia), in commemoration of the battle of Salamis, was held. The hill was the scene of the battle between the patriots under Thrasybulus and the Thirty Tyrants, 404 B.C.

Münzer (münt'sēr), Thomas, abt. 1490-1525; German reformer; b. Stolberg, in the Harz Mountains; was a preacher at Zwickau, Saxony, and, 1523, at Allstedt, Thuringia; at first worked in unison with the reformers; then demanded radical reforms in church and state; believed himself divinely guided through dreams and revelations. After expulsion from Allstedt he preached in various places, and finally settled at Mühlhausen, where he overthrew the city council, and appointed another which was under his control. When the Peasants' War broke out in S. Germany (1525) he instigated the people of Mühlhausen and Langensalza to rise in revolt, but they were routed in battle, Münzer was taken prisoner, put to the torture, and beheaded.

Mur (mōr), river of Austria; rises in the Mureck Mountains, in district of Salzburg; enters Styria, where it becomes navigable at Judenburg, and passes by Gratz; flows through Hungary into Croatia, and joins the Drave at Legrad, after a course of 230 m. It receives about 100 affluents, among which are the Kainach, Lasznitz, Sulm, Pölz, and Mürz, but none is navigable.

Murad (mō'rād), or Amurath (ā-mō-rāt'), name of several Ottoman sultans: MURAD I, called Ghazi the Victorious, 1326-89; son of Sultan Orkhan Ghazi; succeeded, 1360; captured Adrianople, 1360, and made it the Ottoman capital, 1365; subdued a large part of Asia Minor; captured Thessalonica, 1386, and crushed Serbia at the battle of Kosovo, where

he was slain. **MURAD II**, 1403-51; son of Mohammed I; succeeded, 1421; conquered Phrygia and Karamania; subjected the Peloponnesus to tribute and consolidated the empire; but was unsuccessful at the siege of Constantinople, 1422, and of Belgrade, 1439, and could not conquer the Albanian Scanderbeg or the Hungarian Huniadi. **MURAD III**, 1546-95; son of Selim II; succeeded, 1574, and on the day of his accession had his five brothers bowstrung. He conquered Georgia, 1578, and carried on a successful war with Persia, 1577-90. He had 129 children. **MURAD IV**, 1611-40; son of Achmet I; succeeded, 1623; captured Bagdad, 1638; reduced the Druses, cowed the Janizaries, and introduced a few reforms. **MURAD V**, 1840-76; son of Abd-ul Medjid; was educated outside the harem, and acquired, among other attainments, that of speaking French. On the dethronement of his uncle, Abd-ul-Aziz, May 29, 1876, he was declared sultan, in preference to the sons of the fallen sovereign, but was himself dethroned August 31st, on the ground of insanity, being replaced by his brother, Abd-ul Hamid.

Muræ'na, typical genus of the moray family of fishes (*Muraenidae*); includes the *Muræna helena*, the famous muræna of the ancients, a European salt-water eel. Its flesh is white and good, and it was artificially bred by the ancient Romans, who prized it extremely.

Murat (mū-rā'), Joachim, 1771-1815; French military officer; b. La Bastide Fortunière, Lot; son of an innkeeper; prepared himself for the Church; dismissed from the seminary, entered a regiment of chasseurs, and, cashiered in the regiment, lived for some time as waiter in a café in Paris. On the establishment of the Constitutional Guard of Louis XVI he became a member of that body, and was afterwards transferred to a regiment of cavalry. He was aid-de-camp to Napoleon, 1795; accompanied him to Egypt, 1798; made general of division, 1799; married, 1800, Caroline, a sister of the First Consul, and was made marshal of France, imperial prince, and grand admiral, 1804. In most of Napoleon's great battles he took a distinguished part. In 1805 he was made Grand Duke of Berg, and, 1808, King of Naples under the name of Joachim I. Napoleon. Murat wished to govern his kingdom independently of France, but every attempt in this direction Napoleon frustrated with indignation. After the battle of Leipzig, Murat hastened to Italy and opened negotiations with Great Britain and Austria, which powers guaranteed him, by a treaty, January 11, 1814, the possession of his throne on the condition of his joining the allies against Napoleon. He marched against Prince Eugene, Viceroy of Italy, but when he heard that the Bourbons insisted violently at the Congress of Vienna on his expulsion, he stopped, and when Napoleon returned from Elba (1815) he at once declared war against Austria. Defeated at Ferrara and Tolentino, he fled to France, where, however, Napoleon refused to receive him. After the battle of Waterloo he was compelled to leave France. With a few adherents, he made a fantastic attempt to invade Naples, but was caught near Pizzo, tried before a court martial, and shot.

Muravieff (mō-rā-vyēf'), name of a family eminent in Russian literary, military, and political history, prominent during the reign of Ivan III (1462-1505), who granted them large tracts of land, and especially noteworthy in the eighteenth and nineteenth centuries. The more important members follow: **MICHAEL**, 1757-1807; author and diplomat; tutor of the grandchildren of Catharine II, who made him a Senator, State Secretary, and curator of the Univ. of Moscow; works include "The Inhabitants of the Suburbs," "Dialogues of the Dead," "Essay on Literature and Morals." **MICHAEL**, 1796-1866; military officer and mathematician; son of Gen. Nicolas Nicolaievitch; fought in campaigns of 1812-15; Governor of Grodno, 1830, when he crushed insubordination with severity; vigorously opposed emancipation of the serfs; put down the students' rebellion, 1861, and the Polish insurrection, 1863; was president of the Russian Geographical Society. **AMURSKI**, **NICOLAS NICOLAIEVITCH**, 1810-81; military officer; served in the Caucasus; Governor General of E. Siberia, 1847, and conquered the territory on the Amur for Russia, 1858, whence he gained the title *Amurski*; negotiated a treaty with Japan very favorable to Russian interests. **KARSKI**, **NICOLAS**, 1793-1856; military officer; son of Gen. Nicolas Nicolaievitch; fought in Russian campaigns of 1812-15; chief of staff during war with Persia, 1827; general in Russo-Turkish War, 1828-29; commanded right wing at capture of Warsaw, 1831, and the army of assistance which disembarked in the Bosphorus, 1833; was disgraced, 1838, but during the Crimean War commanded the army of the Caucasus and captured Kars, 1855, for which exploit he received the title *Karski* and was made a prince.

Murchison (mēr'ki-sōn), Sir Roderick Impey, 1792-1871; Scottish geologist; b. Tarradale, Ross; was an officer in the army, 1807-15, serving in the Peninsula and Sicily; was the associate of Davy; became, 1825, a fellow of the Geological Society, and in 1826 F.R.S.; aided Sedgwick and Lyell in British and Continental geological studies; was one of the founders of the Royal Geographical Society and often its president; knighted, 1846; made K.C.B., 1863; baronet, 1866; became, 1855, director general of the Geological Survey of the United Kingdom. Among his leading works are the "Silurian System," enlarged to "Siluria"; "Geology of Russia and the Ural," and "Geological Atlas of Europe."

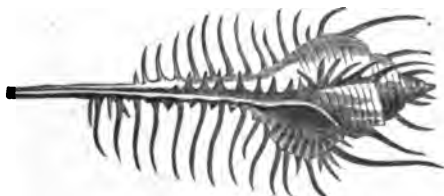
Murcia (mēr'shi-ā), capital of province of Murcia, Spain; on the Segura; 50 m. N. by W. of Cartagena; has good educational institutions, manufactures of silk, linen, mats, cordage, salt-peter, powder, glass, and musical instruments, and an extensive trade. Pop. (1900) 111,539.

Mur'der, crime defined by Blackstone as the unlawful killing of "any reasonable creature in being, and under the king's peace, with malice aforethought, either express or implied," by a person of sound memory and discretion. The element of "malice aforethought" is of the essence of murder. While it is certain that the malice need not be against the individual killed, nor

indeed against any person in particular, still there must be malice; for probably no mere carelessness or negligence would make a case of homicide one of murder. The principal exception to the necessity of proof of actual malice seems to be where the death was caused without intention, but by the commission of or in attempting a felony. Strict and actual compulsion has been held to be an excuse, but nothing less; and murder is an exception to the rule that if a crime be committed by a wife in presence of her husband, it is presumed by the law that she did the act under his coercion, and she is not herself guilty. It seems well settled that if many are confederate in any unlawful act, and some one of them, in doing the act, commit a murder, all are guilty. At common law, counseling suicide, if it causes the suicide, is murder. The question has arisen whether one can be indicted in a state or country for murder if the criminal did actually in that state give the fatal blow or fire the fatal shot, but the injured party went into another state or country and died there. The weight of authority is that no such indictment can be maintained. The death of the person must occur within a year and a day of the time of the alleged cause of death, the day upon which the act is committed being included. In respect to the burden of proof in cases of murder, the actual and practical rule whereby the fate of the prisoner is determined should be and is that the burden of proof remains on the prosecution until they have proved their whole case, which includes the killing and the intent, or "the malice aforethought," without which there can be no murder. In some of the states murder has been divided into degrees; and where capital punishment is retained, only murder in the first degree is punishable with death. See HOMICIDE; MANSLAUGHTER.

Mure, William, 1799-1860; Scottish author; b. Caldwell, Ayrshire; works include "Remarks on the Chronology of the Egyptian Dynasties," "Journal of a Tour in Greece," "A Dissertation upon the Calendar of the Zodiac of Ancient Egypt," and "Critical History of the Language and Literature of Ancient Greece," five volumes, 1850-57. He was a member of Parliament, 1846-55, and lord rector of the Univ. of Glasgow, 1847-48.

Murex, name of a large genus of gasteropod molluscs of the family *Muricidae*. There are some 180 living species, and nearly as many



MUREX (*Murex tenuispina*).

fossil ones, found in the Eocene and later deposits. The living species are world-wide in distribution. *M. brandaris*, *trunculus*, and

others furnished a part of the Tyrian purple dye of the ancients. The animals are all predatory, many of the shells assume singular forms. One of the most remarkable is the Thorny Woodcock or Venus's Comb (*M. tribulus*), from the Spice Islands. *M. regius* of the Pacific coast of tropical America is splendidly colored.

Murfreesboro, or **Stone River, Battle of**, one of the most fiercely contested battles of the Civil War in the U. S.; between the Union forces under Rosecrans and the Confederates under Bragg. Early in the summer of 1862 the city was occupied by a small Union force. On July 13th it was captured by the Confederates under Forrest. Soon after Bragg made it the center of his operations in Tennessee. Late in November Rosecrans moved from Nashville and took up a strong position near Murfreesboro. Skirmishing began on December 26th, but the main engagements took place December 31, 1862, and January 2, 1863. The action of December 31st was severe, but indecisive. On January 2d the Confederate forces made one more vigorous attack. Bragg was finally repelled, and on the 4th he abandoned Murfreesboro, of which Rosecrans took possession next day. The battle was, in proportion to the numbers engaged, one of the bloodiest of the war. Bragg says he had 35,000 men engaged, and that the Union force was about 70,000. Rosecrans puts his force at 43,000, estimating that of the Confederates at 62,000. The Union loss was 1,553 killed, about 7,000 wounded, and 3,000 prisoners. Bragg puts his entire loss at about 10,000.

Muriatic Acid. See HYDROCHLORIC ACID.

Muricidae, or **Muricinae**, family of gastropod molluscs, order *Rhachiglossa*, occurring mostly in the warmer seas. The shell has an anterior canal, and is ornamented by two or more series of thickenings (varices). The genera and species are numerous. One species is said to have been the source of the celebrated Tyrian purple. All the species are carnivorous.

Murillo (mó-rēlyó), **Bartolomé Estéban**, 1613-82; Spanish painter; b. Seville; received his first instruction from a cousin; to earn his living, painted church banners and pictures for exportation to S. America; after studying under Van Dyck and Pedro de Moya, visited Madrid and came under the influence of Velasquez; returned to Seville, 1646, and soon had innumerable commissions. The epoch of his greatest success was 1670-80, when, besides other works, he produced for the Capuchin Church twenty-three pictures, which were sent to S. America later. In 1681 he went to Cadiz to paint in the Capuchin Church an altarpiece, "The Marriage of St. Catherine," and while thus occupied fell from the scaffolding. He returned to Seville, but died from the effects of the injury. He acquired the reputation of being the foremost of Spanish colorists. His works include "The Death of Santa Clara," "San Giovanni Giving Alms," "St. Anthony of Padua," "St. Leander and St. Isidore," and an "Immaculate Conception," in the cathedral at Seville.

Murner (mör'nér), Thomas, abt. 1475-1536; German satirist; b. probably at Strassburg; was educated in the school of the Franciscans, and ordained, 1494; made poet laureate, 1506, by the Emperor Maximilian; taught logic at Cracow; led a wandering life, visiting England, preaching at Lucerne, Heidelberg, and other cities, and finally receiving a small parish at Oberehenheim, Alsace. He was the greatest satirist of the sixteenth century, and attacked Luther and the Reformation bitterly in such works as "The Great Lutheran Fool," "The World of Fools," and "Exorcism of Fools."

Murphy, Francis, 1836-1907; American temperance evangelist; b. Wexford, Ireland; came to the U. S. while a youth; served in the Union army in the Civil War; began active work as a Gospel temperance evangelist at Portland, Me., 1870; organized the first Temperance Reform Club of Maine, of which he was first president; started the "Blue-ribbon" movement at Pittsburg, Pa., 1876, more than 45,000 signing the pledge as a result of his efforts. He campaigned in Europe, Australia, and Hawaii, as well as in all parts of the U. S., and fully 12,000,000 signed the pledge in consequence. During the Spanish-American War he was chaplain of the Fifth Pennsylvania Volunteers.

Murray, Alexander, 1775-1813; Scottish Semitist; b. Dunkitterick; son of a shepherd; took orders in the Church of Scotland, and after serving in several parishes was elected, 1812, Prof. of Oriental Literature at Edinburgh; brought out an edition of Bruce's "Travels in Abyssinia," a "Life" of the author; published "Outlines of Oriental Philology"; left in MS. a "History of the European Languages."

Murray, David Christie, 1847-1907; English novelist; b. W. Brommich; was a reporter on the Birmingham *Morning News*; settled in London, 1873, and served on the staff of the *Daily News* and *World*; was special correspondent for the *Times* during the Russo-Turkish War; lectured in Australia, and in the U. S. and Canada, 1894-95; edited *The Morning*, a London half-penny daily, after 1886. His first novel, "A Life's Atonement," appeared 1880; his last, "Despair's Last Journey," 1901. Other works include "Joseph's Coat," "Coals of Fire," "A Rogue's Conscience," "The Martyred Five," and several written with Henry Herman, such as "One Traveler Returns" and "He Fell among Thieves."

Murray, James Augustus Henry, 1837-1915; Scottish lexicographer; b. Denholm; was Assistant Examiner in English, Univ. of London, 1876-79; president of Philological Society, London, 1878-80, 1882-84; edited the "New English Dictionary"; published "Dialect of the Southern Counties of Scotland"; edited for the Early English Text Society the minor poems of Sir David Lyndesay, "The Complaint of Scotland," etc.

Murray, or Mor'ay, James Stuart (Earl of), abt. 1533-70; regent of Scotland; natural son of James V by Lady Margaret Erskine; in

1556 joined the Scottish Reformers and soon assumed the leadership of the Protestant party; was appointed member of the council for civil affairs, 1559; went to France to invite his half-sister Mary to return to Scotland as queen; became her prime minister and chief adviser. He was created Earl of Noar, 1562, but resigned the title in favor of his uncle, Lord Erskine, and received the earldom of Murray; governed Scotland with prudence, but offended the extreme Protestants by his neutrality in the religious conflict then beginning. He took up arms to prevent Mary's marriage with Darnley, but was defeated and escaped into England; was recalled, 1566; induced Mary to abdicate; was proclaimed regent, August 22d; defeated his sister's forces, 1568; at the trial of Mary for the murder of Darnley, gave his testimony against her, and produced as evidence the famous "Casket letters." He was assassinated in the streets of Linlithgow by one of Mary's followers.

Murray, John, 1778-1843; English publisher; b. London; son of a Scotchman named McMurray, who founded a bookselling shop in London. Succeeding at the age of fifteen to his father's business, young Murray became the friend and liberal patron of a famous circle of literary men. Among them were Byron, Moore, Campbell, Crabbe, Irving, and Gifford, the latter of whom edited for many years Murray's *Quarterly Review*, founded, 1809, as a Tory organ in opposition to *The Edinburgh Review*. His son, bearing the same name, edited a series entitled the "Home and Colonial Library," personally superintended the preparation of the well-known "Murray's Handbooks of Travel," and brought out many works by historians and scientists. In 1869 he established *The Academy*. The business was continued by a grandson, also named John.

Murray, Lindley, 1745-1826; American grammarian; b. Swatara, Pa.; removed, 1753, to New York City; admitted to the bar, 1776; later settled in Holdgate, near York, England, and devoted himself to literary pursuits; best known by his "English Grammar," 1795, which had a prodigious currency, particularly in Great Britain; published also an "English Reader," a spelling book, and other educational works.

Murray, William. See MANSFIELD, EARL OF.

Murray Bay, also called MALBAIE, watering place on the N. shore of the St. Lawrence, in Charlevoix Co., Quebec; about 90 m. E. of city of Quebec. The bay on which the village is built is the estuary of the Murray River. The scenery around the village is very picturesque.

Murray River, principal river of Australia; rises on the W. slope of the Australian Alps, and falls into Encounter Bay, after a tortuous course of 1,200 m. Its mouth is too shallow to be entered by large vessels, but the lower portion is navigable. The chief tributaries are the Murrumbidgee and the Darling, both on the N.

Murree, town and sanitarium of the Punjab; 30 m. NE. of Rawal Pindi, on the upper

slopes of Murree Mountain; from 6,200 to 6,500 ft. above sea level; is in summer the seat of the government.

Musæus, (1) a singer, seer, and priest who flourished in the times before Homer; was a pupil or son of Orpheus, and introduced hymns and other sacred poetry into Attica; his poems were collected by Onomacritus, who forged many of them. (2) A grammarian who imitated Nonnus, and wrote an epic poem on the story of Hero and Leander.

Muscadine, name applied to a species of grape (*Vitis rotundifolia*), indigenous to the S. parts of the U. S. It is also popularly called bullace or bullitt grape, and fox grape. The white scuppernong grape, which is one of its varieties, is much esteemed.

Muscat', or **Mascot**, imamate in Arabia with indefinite boundaries; one of the eight divisions of Oman, lying SW. of the Gulf of Oman; comprises also a narrow strip of land along the shores of Laristan and Moghestan. Cotton, rice, maize, coffee, and tropical fruits of every sort are produced in abundance.

Muscat, a seaport. See **MASKAT**.

Muscatine (mūs-kā-tēn'), capital of Muscatine Co., Iowa; on the great bend of the Mississippi River; 30 m. W. of Davenport; has a county hospital, county insane asylum, Lutheran Orphans' Home, Leverick Normal School, and Old Ladies' Home. The manufacturing industries include sawmills, sash, door, and blind factories, iron rolling mill, oatmeal mill, large box factory, plumbing supply factory, woven-wire picket-fence factory, brick and tile works, iron foundries, marble works, cigar factories, pearl button works, machine shops, potteries, carriage, wagon, and harness factories, and large pickling works. Pop. (1910) 16,178.

Muschelkalk (mōsh'ēl-kālk), in Germany, a great limestone, belonging in the middle of the Triassic period, and resting, typically, on the Bunter sandstone, and covered by the Keuper or red marl beds. It is named for its abundant fossils, and supplies lime, marl, rock salt, gypsum, and building stone.

Muscle, the tissue through the direct agency of which the various movements of animals are effected. Very early in embryonic life a part of the great mesodermic layer differentiates into elongated elements distinguished by the possession of contractility in limited and definite directions; these elements form the muscular tissue. In man and the higher animals muscular tissue is separated into two varieties, *voluntary* and *involuntary*, according to its control by the will or independence of action: the voluntary muscle constitutes the great masses of sarcoous substance or "flesh" of animals by which the various movements are carried out at will; the involuntary muscle, on the contrary, forms the walls of the hollow organs, as the stomach, intestines, blood vessels, etc., whose contractions are beyond the control of volition. The number of individual contracting bands or "muscles" increases with the subdivision of labor and the specialization

of action in the higher types, in man over 200 distinct muscles being recognized.

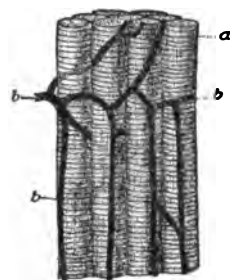
The close association of these organs with the skeleton separates them into the corresponding groups of the muscles of the *axis* and those of the *extremities*, many of the latter group passing from the more fixed points of the axial skeleton to the upper parts of the freely moving limbs. The more rigid point of attachment of a muscle is spoken of as its *origin* in contrast to its *insertion* or attachment to the part moved; in many cases, however, the position of greatest fixation varies from time to time with the particular action to be secured. Muscular tissue is attached to other parts by means of dense white fibrous tissue, usually in the form of *tendons* or of aponeurotic expansions; in early life the tendons are relatively small and exceedingly pliant, as evinced by the greater suppleness and agility of youth as contrasted with the increasing rigidity of age due to the invasion of the muscular tissue by the encroaching tendinous structures.

Muscle Reading, or **Mind Reading**, apparent detection of the thoughts of another from simple muscular contact with him. The muscular system reflects in a remarkable way the course of thought through all its concrete imagery. It is therefore possible that certain persons, of delicacy of touch and with training, should be able by simple contact to interpret these slight movements of the hand muscles of another, and so to seem to divine his thoughts directly. See **TELEPATHY**.

Muscovy Duck, S. American duck (*Cairina moschata*) about 2 ft. in length, and, in its wild state, of a black color with blue and green reflections. The species has been extensively domesticated, and its name is a perversion of musk duck, applied to the bird on account of its peculiar odor.

Muses, in classical mythology, the goddesses originally of song, and afterwards of all kinds of poetry and of the arts and sciences. According to the earliest legends, they had their principal seats in Pieria on Mt. Olympus and in Bœotia on Mt. Helicon. They were commonly esteemed the daughters of Jupiter and Mnemosyne. Hesiod first gives the names of all the nine: Clio, the muse of history; Euterpe, of lyric poetry; Thalia, of comedy; Melpomene, of tragedy; Terpsichore, of choral dance and song; Erato, of erotic poetry; Polyhymnia, of the sublime hymn; Urania, of astronomy; and Calliope, of epic poetry.

Museum, institution for the preservation of works of art, antiquities, and objects of nat-



A BIT OF MUSCLE WITH ITS BLOOD VESSELS.

a, the muscle fibers; b, the minute blood vessels.

ural history, and for their utilization in research, and in the culture and enlightenment of the people. Originally, museums were places sacred to the Muses, such as the groves of Parnassus and Helicon; later, temples in various parts of Greece were known by this name; and still later the meaning of the word changed, and it was applied to a place of study or a school. The Museum of Alexandria, founded by the Ptolemys 296 B.C., was a portion of the palace at Alexandria, which was set apart for the study of the sciences, and contained the great Alexandrian library. After the burning of this building the term museum, as applied to a great public institution, dropped out of use until the seventeenth century. The idea of a great national museum of science and art of the modern type was first outlined by Bacon in his "New Atlantis," and the British Museum, founded in London, 1753, containing collections of books and manuscripts, as well as works of art and nature, was in some degree a realization of that plan. This institution is, at least to English-speaking people, the most important in the world bearing the name of museum, partly because of its magnificent library, and also from its unrivaled archaeological collections—Egyptian, Assyrian, Oriental, Greek, Roman—prehistoric and mediæval; its coins, its manuscripts, and its prints.

Museums may be classified in two ways: (1) By the character of their contents, or (2) by the object for which they were founded. Under the first head they may be grouped as follows: (1) Museums of art; (2) historical museums; (3) anthropological museums; (4) natural history museums; (5) technological museums; (6) commercial museums. Under the second category they may be classed as (1) national museums, these being often in groups rather than combined in one; (2) local, provincial, or city museums; (3) college museums; (4) professional or class museums. Commercial museums exhibit salable articles of all kinds, with illustrations of markets, means of commercial distribution, prices, and commercial demand and supply. The Musée de Melle at Ghent and the Philadelphia Museum at Philadelphia are the most famous of this class. Commercial museums are especially useful in great centers of manufacture and trade, especially when coupled with an efficient service of foreign correspondents. Such museums may be properly connected with a technological museum, although its methods are likely to be more akin to the exhibition, exposition, or fair, involving a frequent renewal of exhibits in connection with commercial changes, and also certain features of competition and advertising display on the part of private exhibitors.

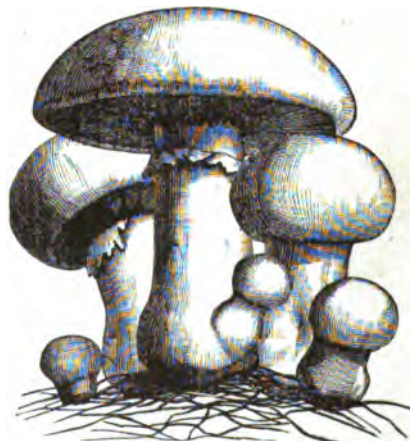
Mush'room, name of several edible fungi, chiefly of the genus *Agaricus*. The common mushroom, *A. campestris*, is to be distinguished by its white, firm, solid stem, its fleshy cap, and its pink gills; when the cap begins to expand the gills are pale, but they soon become pink; when older the gills become chocolate colored and then tawny black, in which state they are regarded as unfit for food. It has a pleasant and characteristic odor, by which those familiar with it can distinguish

the plant. This species is found in pastures, and in some years in great abundance. It is the only species cultivated. Mushrooms resemble flesh in flavor more nearly than do any other vegetables. They are used to form a dish by themselves, either stewed, broiled, or baked,



HORSE MUSHROOM.

and are largely employed to flavor other dishes, entering into a variety of stews, fricassees, and sauces. There are no simple rules that may be taken as infallible guides for distinguishing esculent from poisonous species. The following rules are only of a general character, having some exceptions: (1) *Avoid bright colors* (this would throw out the highly prized chanterelle of the French and several other species); (2) *avoid those that change color when cut or broken*; (3) *avoid those with a milky*



COMMON MUSHROOM.

juice (*Lactarius deliciosus* has a milky juice, and is still delicious); (4) those that *deliquesce should be avoided*—the *Coprinus comatus* is a grand exception to this rule.

The safest of all rules is never to use a fungus about which there is any doubt; this will require a thorough acquaintance with at least a few of the edible species, which will take no more time than to become familiar

with the same number of shrubs or trees. Care should also be exercised to gather only the fresh plants, and they should not be allowed to remain a long time before being eaten. Climate and the seasons seem to exert an influence over fungi as regards their edible qualities. A much larger per cent of the spring species are edible than those of autumn.


Most fungi require for their best development a moist atmosphere, with the exclusion of bright sunlight. The common and most successful method of cultivating the mushroom and edible toadstools is to mix fresh horse-dung with loam in such proportions as to prevent too violent fermentation, when it is put in long narrow beds of a foot or 18 in. in height in the center, into which the mycelium or spawn is placed, and the whole coated over with a layer of loam. These beds are usually protected from the light and drying influences of the sun by low sheds, having the roofs thatched to prevent too rapid evaporation of moisture. A covering of hay or straw is often placed directly upon the beds.


Mu'sic, any succession of sounds so modulated as to please the ear; also the art of producing such melodious and harmonious sounds, and the science which treats of their properties, dependencies, and relations. Sound is conveyed through elastic media, as the atmosphere or water, by undulations, which may be generated in the medium itself, as by a flute or organ pipe, or transmitted to it by the vibrations of violin or pianoforte strings or the reeds of a wind instrument. When the vibrations are fewer than sixteen in a second or more than 8,192 the sound ceases to have a musical character. The *pitch* or relative height of a tone is determined by the number of vibrations in a given time, the lower numbers giving the grave or deep tones, the higher the acute or shrill tones. The loudness of a tone is determined by the largeness of the vibrations, not by their number. The note or musical sound called middle C on the pianoforte is usually assumed by theorists to be produced by 512 vibrations per second, and this was long the pitch recognized in practice as the standard or concert pitch useful for the guidance of all musicians. The perpetual striving after increased brilliance of tone led, however, to a gradual heightening of the pitch, and in the course of a century the middle C in France had become 522 vibrations, while in England and Germany it was somewhat higher. Of late years there has been a movement among European musicians to lower the pitch to about the French standard, and this lower pitch has been now adopted by many foreign nations.

A note produced by double the number of vibrations required to produce any given note will be found to be in perfect unison with it, though higher in pitch. Between two such notes there is a gradation by seven intervals in the pitch of tone, more agreeable (at least to modern European ears) than any other, the whole forming a complete scale of music called the *diatonic scale*. The space between the notes sounding in unison is termed an *octave*, and the note completing the octave may be-

come the keynote of a similar succession of seven notes, each an octave higher or double the pitch of the corresponding note in the first scale. These seven notes of the diatonic scale are designated by the first seven letters of the alphabet, and each note bears a fixed ratio to the keynote in respect of pitch as determined by the number of vibrations.

The scale may be extended up or down so long as the sounds continue to be musical. In order to allow reference to be made to the various degrees of scales without reference to the key in which they are pitched, the tones composing the octave are known in their ascending order as (1) tonic or keynote, (2) supertonic, (3) mediant, (4) subdominant, (5) dominant, (6) superdominant or submediant, (7) leading note or subtonic, (8) final note. The tonic, the subdominant, and the dominant are the governing or emphatic notes of the scale.

Every sound employed in the art of music is represented by characters called notes on a staff—that is, five equidistant horizontal lines on or between which the notes are placed. A note represents a higher or a lower sound, according as it is placed higher or lower on the staff. When any note is higher or lower in pitch than can be placed upon the staff, short lines called *ledger lines* are added above or below the staff to indicate the relation of the note to those on the staff. As, however, the multiplication of ledger lines is liable to become embarrassing to the eye, musicians have endeavored to overcome the difficulty by the use of more than one staff. The staves are the *bass*, *mean*, and the *treble*, but the second is now seldom used. The treble staff, which contains the upper notes, is distinguished by a character called a G or treble clef , the bass

by a character called the F or bass clef .

The steps in every diatonic scale must correspond to those of the scale of C, but in selecting another keynote than C it is necessary to modify some of the natural notes by the insertion of what are called *sharps* or *flats*, in order to preserve the required relation and sequence of the intervals (the tones and semitones in their due relative positions), and so produce the major musical progression. The sharp (\sharp) placed before a note raises the pitch by a semitone; the flat (\flat) lowers it by a semitone. A sharp or flat placed at the beginning of a staff affects every note upon the line which it dominates, unless the contrary be indicated by the sign of the *natural* (\natural), which restores the note to which it is attached to its normal pitch.

Besides the forms of the diatonic scale, which have an interval of two tones between the tonic and third, and is called the *major scale*, there are *minor scales*, of which the most important kind has an interval of a tone and semitone between its tonic and third, the seventh note being sharpened so as to form a leading note. There is still another kind of scale, called the *chromatic* (Greek *chrōma*, color), because, like colors in painting, it embellishes the diatonic by its semitones. It consists of

thirteen notes, and usually ascends by sharps and descends by flats.

Intervals in music (*i.e.*, the distance from any one note to any other) are reckoned always upward and inclusively by the number of names of notes they contain, both limits to the interval being counted. Thus C to E is a third, both C and E being counted in the interval. Every piece of music is divided into portions equal in time, called *measures*, which are separated from one another by vertical lines called *bars*. The term bar is often loosely applied to the measure as well as to the line. The exact length of the measure is indicated by a sign at the beginning of the piece of music. Common time, indicated by a C, is written after clef. Another form of common time is marked with a ϕ . Another method of indicating time (or rather more correctly, rhythm) is by figures, in the form of a fraction. The figures of the denominator are either 2, 4, 8, or 16, and the numerator shows the number of these fractional parts in the measure. Besides common time, which may be indicated in two ways, there is triple time, which can only be marked by figures; these are $\frac{3}{4}$, $\frac{3}{8}$, or $\frac{3}{16}$. The object of the division of musical passages into measures is to indicate their rhythm. Notes, like words or syllables, are *accented* or *unaccented*. The strongest accent is given to the first note of a measure. In common time of four notes to the measure the third has a subordinate accent. When a curve is placed over two notes in the same degree, but not in the same bar, the two notes are played as one of the length of both, and the first note requires the accent. This displacement of the accent is called *syncopation*. If the curve is written over notes of different degrees it is called a *slur*, and indicates that the notes are to be played or sung smoothly, as if gliding into each other. When an opposite effect is wanted, that is, when the notes are to be produced distinct and detached (*staccato*), a dot is placed over them. The various degrees of loudness and softness which occur in a piece of music are indicated by such Italian words as *forte*, loud; *fortissimo*, very loud; *piano*, soft; *pianissimo*, very soft. In order to save time in writing music various abbreviations are used.

Melody is a particular succession of sounds in a single part. A melody generally consists of an even number of phrases; this number may be four, eight, twelve, or sixteen, and generally corresponds with a line in a verse of poetry. In order to produce an agreeable variety, a melody may pass from the form of the scale in which it started to another, generally to the one most nearly related to it, that of the dominant or subdominant. This change from one key into another is called *modulation*. When several voices or instruments produce at the same instant sounds different in pitch, and so combined as to cause an agreeable sensation on the ear, the combination is called *harmonious*, and the proper method of combining these sounds is called the art of *harmony*. The series of notes taken by a single voice or instrument capable of producing only one note at a time is called a *part*. Four parts are by far

the most common; but five, six, seven, eight, and even more numerous parts are common in the ecclesiastical compositions and madrigals of the old masters.

History.—The first public use of music by every people has been in religious rites and ceremonies. The music of the Hebrew worship was of an elaborate character, and was probably derived from Egypt. To the Egyptian priests, the Greeks seem also to have owed their ideas of music. The Romans derived all their public music from the Etruscans, and the art was for a long period confined to sacred uses. St. Ambrose (elected Archbishop of Milan, 374) may be regarded as the father of the music of the Western Church, as he not only composed and adapted music to the different portions of the Church service, but determined the musical idiom in which it was to be cast by selecting a set of simple scales from the exceedingly complicated system of the Greeks. His reputation has, however, been somewhat obscured by the next great musical reformer, Gregory the Great, whose epoch is fully two centuries nearer our own. The greatest name, however, of the early Middle Ages is that of Guido Aretino (died 1050). The names which he gave to the notes, Ut (for Do), Re, Mi, Fa, Sol, La, are universally used to this day. Si was afterwards added. The middle of the fourteenth century gives us the first example of four-part music, in a mass performed at the coronation of Charles V of France (1360) and composed by Guillaume de Machault. By this time the organ had reached some degree of mechanical perfection, and several Belgian musicians visiting Rome in the last years of the fourteenth century carried with them the first masses that had ever been seen there in written counterpoint.

The first Roman school was founded by Claude Gondimel (1510-72), among whose pupils was the great composer, Giovanni Pierluigi Palestrina (1524-94). Carissimi, born abt. 1600, was the first great master of the sacred cantata in its various forms. He is said to have been the teacher of Alessandro Scarlatti, the founder of the Neapolitan school. With this school begins modern musical practice: better methods of fingering the keyed instruments, and of bowing the stringed instruments, not to speak of improvements in the instruments themselves, and above all these in importance and difficulty, the art of singing.

An entirely new era was opened by the advent of Handel, who may be said to belong to England rather than Germany. From about the middle of the eighteenth century, when the career of J. Sebastian Bach ended, Germany has indisputably held the highest place in music. Gluck, Haydn, Mozart, Emmanuel Bach, and many others, before and after, owe much of the sweetness which they united with German strength to their study of the Italian masters. But in Beethoven, Weber, Spohr, and Mendelssohn the traces of S. influence are hidden, and new emotional and poetic elements begin to find their way into music. Against the best works of the German masters those of the purely sensuous Italian school are

MUSK

represented by Donizetti, Bellini, and Verdi. Of the later German school, claiming as its starting point Beethoven's "Ninth Symphony," in which poetry and music form a perfect whole, the chief exponents have been Wagner and Liszt, though with these must be cited the names of Schubert, Schumann, Mendelssohn, Berlioz, Chopin, and Franz. Among the more recent composers may be noted the names of Gounod in France, Rubinstein and Brahms in Germany, Dvořák in Bohemia, Boito in Italy, Grieg in Scandinavia. See HARMONY; MELODY.

Musk, concrete, strong-smelling, brownish, inflammable substance employed in medicine and in perfumery; obtained from the preputial sac of the musk deer, and brought to market from China, Russia, and Calcutta; the musk of the warmer regions is by far the best. The affluence of perfume in musk is almost incredible, being apparently undiminished by lapse of time. The price of musk is very high, and it is in consequence excessively adulterated. Artificial musk is obtained by treating oil of amber with nitric acid.

Musk Deer, small deer (*Moschus moschiferus*) inhabiting the highlands of central and E. Asia, and rarely found in summer below an elevation of 8,000 ft. The musk deer is about



MUSK DEER.

20 in. high at the shoulder, of a grayish brown, sometimes tinge, sometimes mottled with lighter blotches. The hair is long and coarse. Antlers are lacking, but the male has a pair of long canine teeth in the upper jaw.

Muskegon, capital of Muskegon Co., Mich.; on Lake Michigan at the mouth of the Muskegon River; 38 m. NW. of Grand Rapids; has a water frontage of 12 m. on an enlargement of the river locally known as Muskegon Lake, and one of the best harbors; nearly landlocked and open all the year, on Lake Michigan, with regular steamer communication with all important lake ports. It contains the Hackley Manual Training School, Hackley Public Library, Hendricks and Hauber hospitals; is largely interested in various branches of the lumber interest; and has foundries, machine

MUSKRAT

shops, marble and granite works, furniture factories, tanneries, woolen mills, iron and steel works, breweries, and brick and tile works. Pop. (1910) 24,062.

Mus'kellunge. See MASCALONGE.

Muskin'gum, longest river wholly in Ohio; formed at Coshocton by the confluence of the Tuscarawas and the Walhonding rivers; thence flows generally SE., 112 m. to the Ohio at Marietta.

Musk'melon, fruit of the *Cucumis melo*, a plant of the gourd family, which is probably indigenous to India and adjacent parts of Asia. Among the more than eighty varieties of muskmelon are the cantaloupe, distinguished by hard and more or less warty or rough rind, often deeply furrowed, deriving its name from Cantaluppi, near Rome, where these melons were early grown from Eastern sources; the netted melon, common in the U. S., which keeps until midwinter; the *dudaim* or Queen Anne's pocket melon, about the size of a turkey's egg, grown simply for its delicious perfume; the sugar melon, oblong in shape; the serpent melon or snake cucumber, grown chiefly as a curiosity; and the chito melon (vegetable orange, melon apple), about the size of a hen's egg, used for pickles or preserves.

Musko'ka, lake, river, and county of Ontario, Canada; on the E. side of Georgian Bay; name is loosely applied to the entire district from Severn River to Lake Nipissing, and NE. to the Ottawa River. Thus defined it is about half as large as Maine.

Musk Ox, sole member of a peculiar ox family; so named from the musky flavor of the bulls and old cows; is about the size of a small heifer; horns large at the base, in old males almost meeting on the forehead; body heavy and legs short; coat very long, thick, dark-brown hair; feeds on grass, lichens, and the twigs of pine and willow. The animal is at present confined to the extreme N. parts of the N. American continent, where it ranges over the barren grounds to the N. of lat. 60°, roaming in summer to the islands within the Arctic Circle.



MUSK OX.

Musk'rat, name applied in different countries to several ratlike mammals distinguished by musky exhalations. (1) In N. America it is conferred on the *Fiber zibethicus* (by some called also *musquash*), a rodent of the family *Muridae*. It is some 15 in. in length, with a tail of 10 in.; is aquatic, sometimes building houses like those of the beaver, and oftener burrowing in river banks. Its fur (the "river sable" of commerce) is extensively sold in

Europe. (2) In India the name is given to the *Crocidura myosurus*, a large, ratlike shrew,

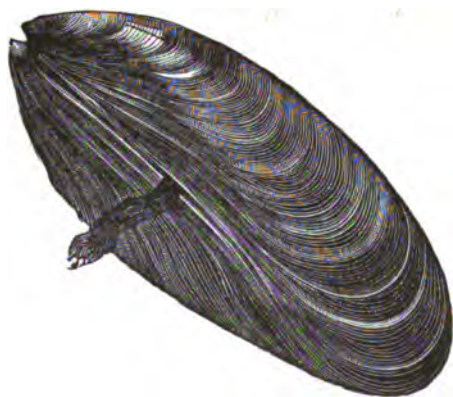


MUSKRAT.

which possesses and communicates to whatever it touches an intolerable musklike smell.

Mus'pratt, James Sheridan, 1821-71; Irish chemist; b. Dublin; early acquired great proficiency in applied chemistry, studied under Liebig at Giessen, 1843-45, and while there, in a paper in the *Annalen*, proved the analogy between the sulphites and the carbonates, and edited Plattner's "Treatise on the Blowpipe," with many valuable additions. In 1848 he founded the College of Chemistry in Liverpool. He published a "Dictionary of Chemistry" and "Outlines of Quantitative Analysis for Students."

Mus'sel, name applied to many species of bivalve mollusca, but more properly restricted to the members of the family *Mytilidae*, and with the qualification fresh-water mussel to the *Unionidae*. The marine mussels have an elongated shell closed by a single muscle, and



A MUSSEL.

they have the ability to anchor themselves to any solid support by a cable of silken threads. Most of the species live in shallow water, and the common mussel (*M. edulis*), common to the colder waters of Europe and America, is often eaten in the Old World. The fresh-water mussels are useless as a food supply for man.

Musset (mü-sä'), Louis Charles Alfred de, 1810-57; French poet; b. Paris; became, 1838,

librarian of the Department of the Interior, and later of the Department of Public Instruction; elected to the Academy, 1852; works include "Tales of Spain and Italy," "The Cup and the Lips," a drama; four poems entitled "The Nights" (his masterpieces); "Confessions of a Child of the Age," a prose story; "Comedies and Proverbs"; and a few short stories of fresh and simple sentiment. He is ranked with Hugo and Lamartine as one of the first three French poets of the nineteenth century.

Mus'tang, name applied to the small wild horse of Texas and to the pony of the Indian tribes of the SW. of the U. S., which are of one and the same stock, descended from horses of Spanish importation. They associate in large troops, are caught for use by the reata or lasso, and are easily broken to the saddle. They are hardy and spirited, but often very fractious unless carefully handled.

Mus'tapha, name of several sultans of Turkey: **MUSTAPHA I**, 1591-1623; son of Mohammed III; ruled 1617, 1622-23; was an imbecile, twice deposed. **MUSTAPHA II**, 1664-1704; son of Mohammed IV; was an able and just prince, ruling 1695-1703; under him was signed the Treaty of Carlovitz, which sanctioned the first dismemberment of the Ottoman Empire; was deposed. **MUSTAPHA III**, 1717-74; reigned 1757-74; was a son of Achmet III; though animated by high purposes, failed to carry out internal reforms, or retard the decline of the empire. **MUSTAPHA IV**, 1779-1808; succeeded Selim III, 1807; an opponent of reform, he owed his promotion to the Janissaries, who deposed and strangled him.

Mus'tard, seed of a number of annual plants of the genus *Brassica* (formerly classed as *Sinapis*) in the natural order *Cruciferae*. Black mustard is the seed of *Brassica nigra*, and



MUSTARD.

white that of *B. alba*, native in all parts of Europe, and cultivated in gardens in the U. S. Black-mustard seeds are small, globular, of a deep-brown color externally and yellow within. The white are larger, and of a light color ex-

ternally. Flour of mustard consists of a mixture of the two kinds of seeds, ground and sifted. As sold, it is generally adulterated with wheat flour and turmeric. Such adulteration is infallibly betrayed by the presence of starch grains, which are absent in pure mustard. Mustard flour is a popular condiment, and was known to the ancients. It has also medicinal uses. The moistened flour applied to the skin is a powerful irritant and vesicant, and is much used as a counterirritant to relieve internal pains and spasms. A tablespoonful diffused in a tumbler of water and swallowed acts as a prompt nonnauseating emetic, often convenient in cases of poisoning.

Mutation. See UMLAUT.

Mutes, in phonetics, sounds that are the result of a check on the breath or the breaking of a check; commonest illustrations are *k*, *g*, *t*, *d*, *p*, *b*.

Mu'tiny, In'dian. See INDIAN OR SEPOY MUTINY.

Mutsuhito (môt'sô-ah-tô), 1852-1912; Emperor of Japan; ascended the throne 1867. His administration was notable for the great reforms introduced and the remarkable development of the empire. The official designation of his reign period was Mei-ji (mă'jê).

Muttra, **Mattrā** (mût'rā), or **Mathura** (măth'ô-rā), town of British India, in the United Provinces of Agra and Oudh; on the Jumna; is a very ancient and celebrated city, mentioned by Ptolemy as the "Modoura of the gods," a railway station, and capital of a district of the same name. As the birthplace of Krishna it is venerated by the Brahmans, and visited by a great number of pilgrims. The shores of the river are provided with gorgeous flights of steps, and the city contains an immense temple, which once possessed idols of gold and silver, with eyes of diamonds. These were carried away by foreign conquerors. Sacred apes and swarms of holy parrots and peacocks are kept here. Pop. (1901) 60,042.

Myc'ale, modern **SAMSUM**; extreme W. branch of Mt. Mesogis, in Lydia, Asia Minor, terminating in the promontory called Trogylium (now Cape Santa Maria). In the narrow channel between this promontory and the island of Samos the Persian fleet was defeated and destroyed by the Greeks, 479 B.C. It is probable that at the time of the battle there was a town—Mycale or Mycallesus—at the foot of the promontory, but no certain account of it is extant.

Mycenæ, or **Mycene**, one of the oldest cities of Greece; on a rocky eminence in the plain of Argos, in the Peloponnesus; was the residence of the Pelopidæ, and at the time of Agamemnon was the principal city of Greece. In 468 B.C. it was totally destroyed, and it was never rebuilt, but the remains of it, the cyclopean walls, the gate of lions, and the treasury of Atreus, are among the grandest and most interesting antiquities in Greece. The excavations of Schliemann, 1876, and of the Greek

Archæological Society, 1886-88, added much to our knowledge of the importance of Mycenæ, for they brought vast treasures to light, and opened up an entirely new chapter in the history of early art.

Mycerinos (mls-ê-rî'nûs), sixth king of the fourth Egyptian dynasty; builder of the third largest pyramid at the SW. of Gizeh. In 1837 Col. Vyse found his stone sarcophagus intact and also some pieces of the wooden coffin in his pyramid. The former was lost at sea off Gibraltar. The inscriptions of the latter show a definite form of the Egyptian belief in a future existence. His reputation for piety was enduring, and the thirtieth and sixty-fourth chapters of the Ritual of the Dead were said to have been discovered during his reign, being then already old.

Mycetozo'a. See MYCOMYCETES.

My'er, **Albert James** (familiarily known as **OLD PROBABILITIES**), 1824-80; American meteorologist; b. Newburg, N. Y.; graduated at Hobart College, 1847, and at Buffalo Medical College, 1851; entered the U. S. army as assistant surgeon, 1854; on special duty in the signal service, 1858-60; during the Civil War rendered distinguished services in organizing, instructing, and commanding the signal corps; made chief signal officer in the army, 1866; introduced a full course of study of signals at West Point and Annapolis; organized the meteorological division of the signal office; instituted a system of cautionary day and night signals for lake and ocean navigation, a system of reports for the benefit of interior commerce, and a series for farmers; brigadier general, 1880; author of "Manual of Signals for the United States Army and Navy."

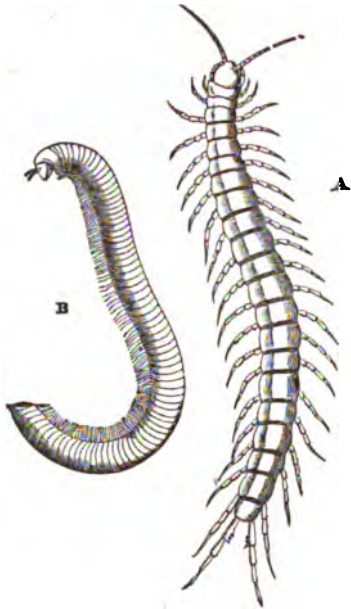
Mylit'ta, goddess worshiped in Babylon, Assyria, and Persia; corresponding in some respects to the Greek Aphrodite Urania; was the great cosmic principle, the great mother, who produced all life in conjunction with Bel (or Baal), her male counterpart. She was worshiped under a variety of names in Asia, and in Greece she was known now as Cybele and now as the Artemis (Diana) of Ephesus.

Myocardit'is. See HEART DISEASE.

Myo'pia, shortsightedness due to excessive convexity of the cornea or to convergence of the visual axes of the eyes. The defect is remedied by concave glasses.

Myriap'oda, class of elongated animals with segment bodies. Popularly they are known as centipedes, millipedes, galley worms, and army worms. In structure they show considerable similarity to the so-called Protracheata (*Peripatus*) and some of the annelid worms, on the one hand, and to the Hexapoda, on the other. Half of the group (Chilopoda) have undoubtedly Hexapodan affinities, while the other half (Diplopoda) must stand by itself. In both groups the number of legs varies greatly. Thus among the Diplopoda *Pauropus* has 9 pairs, *Polyzonus* 15, the *Polydesmida* have 28 to 31, and the *Polyzonida* from 56 to 196 or more. Among

the Chilopoda the number varies from 15 in the *Scutigera* and *Lithobidæ* to 21 and 23

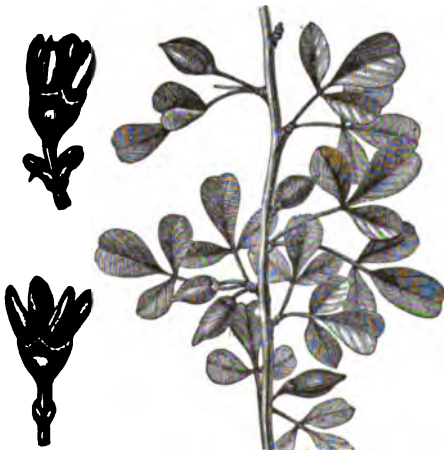


MYRIAPODA.

A. *Scolopendra* (*Chilopoda*). B. *Qulus* (*Diplopoda*).

in *Scolopendridæ* and to as many as 170 and more in one of the *Geophilidæ*.

Myrmidons (mēr'mi-dōnz), followers of Achilles in the campaign against Troy. They came originally from Ægina, and received their name, which means ants, because Zeus, at the request of Æacus during a plague, changed all



MYRRH.

the ants of the island into men, and thus peopled it. Peleus led them into Thessaly, where they settled.

My'ron, Greek sculptor; b. abt. 480 B.C. Besides representing the human figure in difficult

attitudes, he modeled animals with success. His masterpieces were nearly all in bronze. The most celebrated were his "Discobolus," or quoit player, of which several marble copies are extant, and his "Cow."

Myrrh (mēr), concrete juice of one or more trees, among them a small tree (*Commiphora myrrha*) growing in Arabia. Myrrh is exported from the E. Indies in the form of reddish-brown, brittle, resinous lumps, of a fragrant odor and bitter, aromatic taste. Myrrh has been known from the earliest ages, being used as a constituent of incenses, perfumes, and salves.

Myrtle, popular name of trees and shrubs, mostly tropical and evergreen, belonging to the genus *Myrtus*. None are indigenous to N. America. The common European myrtle (*M. communis*) is a fine aromatic shrub whose berries yield a pleasant cordial. The leaves produce an aromatic oil, and water distilled with the flowers is the agreeable perfume known in



COMMON MYRTLE (*Myrtus communis*).

France as *eau d'ange*. Several tropical species are cultivated. The name is popularly but incorrectly extended to other evergreen shrubs.

Mys'ia, in ancient geography, a province of Asia Minor, bordering N. on the Hellespont and Propontis, W. on the Ægean Sea, S. by Lydia, E. by Phrygia and Bithynia. It was subdivided into five territories—Lesser Mysia, Greater Mysia, Troas, Æolis, and Teuthrania. Among its mountains was Ida; among its rivers, the Scamander, Simois, and Granicus; among its cities, Troy.

Mysore (mī-sōr'), feudatory or native state of India under British protection; nearly surrounded by Madras Presidency; area, 29,433 sq. m.; pop. (1901) 5,448,800; reigning family, Hindu; also name of its capital city, 10 m. SW. of Seringapatam; at elevation of 2,330 ft. above sea level; is fortified; has noted manufactures of carpets; pop. (1901) 68,111.

Mys'teries, secret worship of various gods, to which one might be admitted only after

having passed certain initiatory trials or degrees. In addition to what was universally known about any god, there were also certain secret facts and tenets of such a character that they might be divulged to the initiated alone. The Mysteries had their origin in the worship of the powers of nature, as seen in the contrasts of spring and winter, seed time and harvest, the budding of new life from the rotting of the seed. Life springing from death in nature were contrasts which to the devout foreshadowed the history of the human soul. Just as new life sprang from the death of the seed, so new life must also spring from the death of the human body, and hence the doctrines of the immortality of the soul and of retribution after death were added at an early time to the doctrines taught in the Mysteries. Mysteries were held in honor of Demeter and Persephone at Eleusis, of the Cabiri in Samothrace, of Zeus in Crete, and at many places in honor of Dionysus, Cybele, Hecate, Aphrodite, Mithras, Orpheus, Isis, Zagreus, and Sabazius.

Mysteries. See **MIRACLES AND MORALITIES.**

Mysticism, term covering different notions in ceremonial worship, religion, and philosophy. (1) In worship, mysticism denotes the performance of certain rites or mysteries symbolizing and, at the same time, tending to establish certain ineffable relations between God (or the gods) and man. It is common to nearly all forms of worship save the most spiritual, is closely connected with theurgy and magic, and frequently produces enthusiasm or ecstasy in the worshiper. In Greece, this mysticism, which is later than Homer, was confined, for the most part, to the worship of the gods of the earth and the underworld. (2) Religious mysticism grows out of the enthusiastic or ecstatic element in ceremonial worship, and occurs in many religions. It is an attempt to enter into direct communion or union with the divine through (a) some abnormal psychical condition or (b) some faculty of the mind other than reason. It therefore assumes many different forms. (3) Philosophic mysticism seeks either (a) to grasp the divine by means of the reason (dialectic), or else (b) to draw out in terms of the reason the data of the faculty by which it is grasped. The former is pantheistic or panlogistic, the latter theistic. (a) Pantheistic mysticism, proceeding by abstraction, reaches at last the universal predicate, Being, which it then assumes to be the real ground of the universe, God, and, reversing the process of abstraction, tries to deduce the universe from him. (b) Theistic philosophic mysticism is almost peculiar to Christianity, and dates from (the pseudo-) Dionysius and Augustine. It was in part due to the same cause as monasticism, and is closely connected with it. That cause was the secularization of the Church, which forced the more profoundly religious and reflective spirits to withdraw from the practical world and seek satisfaction in speculation.

Mythology, science dealing with that body of poetic and quasi-scientific tradition which

gathers about the religious belief of a race; or, the body of myths themselves. The notion of mythology should be distinguished from the notion of religion; and the myth, though it must be connected with religion, should be distinguished from the cult or round of ceremonies employed in actual worship. While every race of which anything is now known had a mass of interesting myths, the present article is confined to the divinities of the ancient Egyptians, Greeks, and Romans, they being the most common in modern literature. The earliest Egyptian inscriptions, of which some are perhaps from 5,000 to 7,000 years old, bear witness to the existence of an already highly developed mythological system. The inhabitants of lower Egypt differed in religious ideas and practices from those of the upper Nile. At Memphis Ptah, presumably the god of fire and ruler of the region of light, was the object of the highest adoration. He is the father of Ra, the god of the sun, who was the supreme divinity at On or Heliopolis, near Memphis. Eight children of Ptah were worshiped at Oshmoonein or Hermopolis. They are the gods of the elements.

Female deities were worshiped at Sais, Buto, and Bubastis. Neith, adored at Sais, is the cow which bore the sun, the mother of the gods. The goddess of Buto the Greeks compared to Leto, the parent of Apollo, the solar deity. Bast, or Pasht, the Greek Artemis, had her temple at Bubastis. In upper Egypt, Amun, the Greek Ammon, is the creating, sovereign god, represented by Ptah at Memphis. The goddess Maut, or Mut, is the mother and mistress of darkness. Shu, Sos, or Sosis, the son of Amun and Maut, was worshiped principally at This or Thinis and Abydos, as the spirit of the air and the bearer of the heavens. Tum, or Atmu, represents the sun in his nocturnal course, and Mentu, or Mandu, the setting sun. Tum generated himself, and is the father of the gods. Khem, whom the Greeks likened to Pan, is a phallic god. Khnum, Num, Knuphis, or Kneph, regulates the overflowing of the Nile. The goddess Hathor received adoration both in upper and lower Egypt. Seb and Nut, the Greek Cronos and Rhea, are the spirits of the earth and the firmament. The Egyptians looked upon animals as incarnations or representatives of their gods. The bull represented the gods who created life; the cow, the goddesses of conception and birth; the hawk and the cat, gods of light or of the sun; the scarabæus, Ptah; the vulture, Nut and Isis; a sort of ibis, Thoth; and the crocodile, Seb. The holiest of the animals was the bull Apis in the temple of Ptah at Memphis.

The principal divinities of the ancient Greeks and Romans are treated under their own titles; but the prominence of these in modern culture calls for a syncretical survey of the entire theogony. The divinities of heaven are Uranus, Zeus, Hera, Helios, Selene, Eos, Iris, and Æolus; of the water, Poseidon, Amphitrite, tritons, sirens, Nereids, naiads, Scylla, and Charybdis; of the earth, Ge, or Gæa, and Rhea; of the fields, woods, and gardens, Demeter, Pan, Faunus, Terminus, Flora, Pomona, Pales, Vertumnus, and nymphs; of the house and domes-

tic life, Hestia, lares, and penates; of time, the Horæ and Cronos; of the arts, trades, and sciences, Hephæstus, Athena, Apollo, Artemis, Hermes, and the muses; of love and joy, Aphrodite, Eros, the Graces, Hebe, Ganymede, Dionysus, satyrs, and Silenus; of health, Æsculapius and Hygeia; of war and peace, Ares, Bellona, Eris, and Janus; of fate, justice, and retribution, Fatum, Nemesis, Ate, Moiræ or the Fates, Themis, Erinnyes or Eumenidæ, Harpies, Thanatos, and genii; and of the lower or infernal world, Pluto, Persephone, Grææ, Gorgons, Manes, Nyx, and Hypnus. Exclusively Roman divinities among these are Janus, Faunus, Terminus, Vertumnus, Pales, Flora, genii, lares, penates, and manes. In adopting the Greek mythology the Romans transferred to it the names of their own divinities and their own legends, or gave to the Greek names a Latinized form. Thus Cronos they called Saturnus; Uranus, Cælus; Gæa, Terra; Helios, Sol; Zeus, Jupiter; Poseidon, Neptunus; Ares, Mars; Hephæstus, Vulcanus; Hermes, Mercurius; Hera, Juno; Athena, Minerva; Artemis, Diana; Aphrodite, Venus; Eros, Amor; Hestia, Vesta; Demeter, Ceres; Dionysus, Bacchus; Persephone, Proserpina; Selene, Luna; Eos, Aurora; Hypnus, Somnus; and the Moiræ, Parcæ; and these Latin names have prevailed in modern literature. The Scandinavian mythology is the subject of a separate article. See **FOLK-LORE**; **SCANDINAVIAN MYTHOLOGY**.

Mytilene, or **Mitylene** (mīt-ē-lē'nē), the most important city of Lesbos, situated on the E. side of the island. It was celebrated in antiquity as a seat of literature and art, being the birthplace of the poets Alcæus and Sappho; the historians Hellenicus, Chares, and Theophanes; the statesman Pittacus; the philosopher Cratippus; the rhetoricians Lesbionax, Polemo, and Diophanes. The city played an important rôle in every period of Greek history. It is still the chief city of Lesbos. Pop. abt. 15,000. The name is also applied to the island. See **LESBOS**.

Myxomycetes, or **Mycetozoa**, commonly called **SLIME MOLDS**, a group of organisms of doubtful affinity, when referred to the animal kingdom called by the latter name; when to the vegetable kingdom, by the former. They have hitherto been commonly regarded as plants, but are more probably related most closely to the rhizopods among animals. In their growing stage they consist of a naked mass of protoplasm of indefinite size and shape, but in their reproductive stage they are definitely circumscribed masses of dry spores, here reminding one of some of the puff balls among the higher fungi. The vegetative or growing stage of a slime mold, known as the plasmodium, varies in size from minute amoeba-like masses to those as large as one's hand, or larger. They may be flattish and continuous or loosely reticulated, and in consistence they vary from extreme wateriness to a considerable toughness and firmness. They are usually yellowish or reddish. Plasmodia are mostly to be found in decaying bark and wood. They move freely with an amoeboid motion.

When they have reached maturity they come to the surface, and, losing water by evaporation, they divide their protoplasm into minute rounded portions, each of which secretes a wall of cellulose around itself, thus constituting a spore. At the same time the general contour of the plasmodium assumes a definite outline which is characteristic of this stage, while its hardened boundary is known as the peridium. Internally other changes have taken place. The protoplasm usually secretes a more or less extended mass of filaments—the capillitium—which serves to give strength to the sporangium. The substance of the filaments is cellulose, or nearly allied to it, and is often incrustated or combined with lime. The spores germinate by the bursting of their walls and the escape of the protoplasm as amoeba-like bodies, each at length provided with a cilium, which grow in size and coalesce into plasmodia. About 400 species of proper slime molds have been recognized.

N

N, fourteenth letter and eleventh consonant of the English alphabet, corresponding to the fourteenth letter of the Phœnician. The usual sound of the English **N**, or that which it naturally has when not affected by the neighboring consonants, is that of a lingual nasal. See **ABBREVIATIONS**.

Na'bis, d. 192 B.C.; Spartan tyrant who raised himself to supreme power, 207 B.C.; is celebrated for the ingenious cruelties which he practiced to extort from the citizens the means for maintaining a large mercenary force, with which to crush the spirit of Sparta and restore Lacedæmonian supremacy in the Peloponnesus. In 195 he was obliged to purchase peace from the Romans, who had besieged Sparta. He was assassinated by the Ætolian general Alexamenus, who had come ostensibly to his aid against the Achæans.

Nablus (nāb-lōs'), or **Nabulus** (nā-bō-lōs'), town of Palestine, 30 m. N. of Jerusalem; is supposed to occupy the site of ancient Shechem. When restored by the Romans in the reign of Vespasian, it received the name of Neapolis, of which its modern name is a corruption. It has important manufactures, chiefly of soap.

Na'bob, title of office in India, applied during the Mogul Empire to the viceroy of a province. **Nawaub** is the plural of *naib*, prince.

Nabonas'sar E'ra, era employed in the Chaldean and Alexandrian Greek chronology. By Berossus it was reckoned from the accession of King Nabonassar to the Babylonian throne, which took place, February 26, 747 B.C., as shown by astronomical records.

Nadir (nā'dér), in astronomy, the point in the heavens just opposite to the zenith, and

therefore vertically beneath the observer. If a plumb line be held up, the top points to the zenith, the bottom to the nadir. Nadir is used as a figurative term for the lowest possible point.

Nadir Shah (nā'dér shā), or **Kuli Khan** (kō'-lā khān), 1688-1747; Shah of Persia; b. near Kelat; was of low birth; attained high rank in the service of the Governor of Khorasan; was degraded, and became the head of a band of robbers. In 1727 he joined Tamasp, son of the deposed shah, with 5,000 men, expelled the usurping Afghan king, and received several provinces as a reward. In 1731 he defeated the Turks at Hamadan. Shah Tamasp having afterwards made a disgraceful treaty with the Turks, Nadir dethroned him (1732), and made the infant son of Tamasp nominal ruler as Abbas III. Abbas died 1736, and Nadir accepted the crown. He conquered Bokhara and Afghanistan, entered Hindustan, 1739; captured Delhi and the provinces W. of the Indus, and returned to Persia with plunder amounting to \$100,000,000; was assassinated by four of his nobles.

Nævus, or **Birth'mark**, a discolored spot on the skin of a human being, usually characterized by the presence of numerous enlarged blood vessels (more especially venous), and popularly believed to be the result of some ungratified longing on the part of the mother during gestation. Some nævi disappear spontaneously; others remain unchanged; still others grow rapidly, and sometimes inflame and slough. They may be treated by cold and pressure, by vaccination of the spot, by cautery, by excision, by ligation, or by other obliterative methods. Small nævi have been treated successfully by electrolysis.

Nagasaki (nā-gā-sā'ki), seaport of Japan, on island of Kiushiu, for a long time the only Japanese port of entry for foreign vessels; on the E. shore of one of the finest landlocked harbors in the world. Across the bay is a handsomely equipped imperial dockyard. Most of the foreign trade has been transferred to Kobe, but the mines of Takashima still make it an important coaling station. The town is noted for its tortoise-shell bric-à-brac, and for its Imari and Arita porcelain. The most important articles of export, next to coal, are dried fish, rice and other grains, camphor. Pop. (1903) 153,293.

Nagoya (nā-goi'ā), city of Japan; near the bay of Owari, on the main route and railway between the two capitals; was formerly the seat of the powerful daimios of Owari, whose magnificent castle, now used as a military station, still remains intact. The town and district are celebrated for the manufacture of fans, cloisonné ware, porcelain of the "egg shell," "frosted" and other delicate varieties, and silks. The people are devoted Buddhists, and the local temples are fine. Pop. (1903) 238,630.

Nagpur (nāg-pōr'), town of British India; capital of the province of Berar or Nagpur; 430 m. ENE. of Bombay. Its manufactures of cot-

ton cloths, coarse and fine chintzes, woollens, silks, and brocades are important. In 1740 it became the seat of an independent Mahratta prince; 1853, it was incorporated with the British dominions. Pop. (1901) 127,734.

Na'hūm, called the **ELKOSHITE**, seventh of the Hebrew minor prophets, about 700 B.C. Nothing is known of his personal history, but in his book, which is also called "The Burden of Nineveh," he predicted the destruction of Nineveh and the relief of Judah. He also spoke of the goodness of God toward all who believe on Him and the infallibility of divine judgment against all unbelievers. This prophecy was probably written some time between 666 B.C. and 606 B.C., the date of the destruction of Nineveh. Modern explorations in the East have given fresh interest to the study of the book of Nahum.

Naiads (nā'yādz), in Grecian and Roman mythology nymphs who presided over fresh waters, and were supposed to inspire those who drank of them with oracular powers and the gift of poetry.

Nails, plates of horny epidermis which in man grow on the dorsal aspect of the distal phalanges of fingers and toes. They are the homologues of the hoofs and claws of the lower animals.

NAILS, slender pins or pieces of metal, usually tapering and having a head, used for fastening pieces of wood or metal together, or, when driven into any material, for hanging articles on. Nails are classified by the U. S. Patent Office as cut, wrought-wire, horseshoe, shoe, barbed, composition, button, carpet, coffin, sheathing, galvanized, harness, leather work, picture, siding, slating, trunk, upholstery, weather tiling, and screw nails. Of these, the cut, wrought-wire, and horseshoe nails are the most important. In the beginning of the nineteenth century nails were made by hand forging, usually by women and children, the degradation of the workers forming one of the saddest phases of English industrial life. In 1810 a machine invented in the U. S. cut nails from rolled metal plate at the rate of 100 per minute. Modern machines exceed this rate of output. The demand for nails is so great that in the U. S. alone over 500,000 tons of wire are annually made into nails. The rough surface of a cut nail adds twenty per cent to the holding power. Steel is taking the place of iron in cut nails. The rolled nail plate is fed into the machine so that the wide part of the nail is cut alternately from each edge. The word penny in relation to the size of nails means the number of pounds that 1,000 nails of the size will weigh; 1,000 tenpenny nails weigh 10 lbs. Horseshoe nails of the finest iron, to prevent their breaking in the hoof, are among the few nails still made partially by hand.

Na'in, poor little village in Galilee, 6 m. SE. of Nazareth, mentioned only in the New Testament (Luke vii) as the place where Jesus raised the widow's son from the dead. It was then a walled town. It is beautifully situated,

and now contains a few mud and stone houses occupied by Moslems.

Nain, mission station of the Moravian Brothers, on the E. coast of Labrador; politically a part of Newfoundland. The climate is severe.

Nairne (nārn), **Carolina Oliphant** (Baroness), 1766-1845; Scottish poet; b. Gask, Perthshire; called in her youth the Flower of Strathearn, from her great beauty; married, 1806, Capt. W. Murray Nairne, afterwards Lord Nairne; belonged to a prominent Jacobite family; wrote "The Laird o' Cockpen," "The Land o' the Leal," and other popular Scotch ballads, the authorship of which was kept secret until shortly before her death.

Nakoo (nā'kō). See **GAVIAL**.

Namangan (nā-mān-gān'), town and fortress of Ferghana, Russian Turkestan; on the upper Syr-Daria; 50 m. N.E. of Khokan; is the chief commercial city of the upper valley of the river, and transacts a large business in sheep, wool, hides, yarn, and fruit. Pop. (1907) 62,017.

Namaqualand (nā-mā'kwā-lānd), name of two regions in S. Africa; **LITTLE NAMAQUALAND** is in the NW. of Cape Colony; capital, Springbokfontein; is an English possession (pop. abt. 16,800); **GREAT NAMAQUALAND**, a German possession, bounded N. by Damaraland, E. by the Kalihari Desert and British Bechuanaland, S. by Cape Colony, and W. by the Atlantic; is the chief home of the remnant of the uncivilized portion of the Nama or Hottentot people. Pop. abt. 50,000.

Namaquas (nā-mā'kwāz). See **HOTTENTOTS**.

Name, word or words by which a person, place, or thing, or a family or class of persons or things is designated. The Romans had a very complete system of nomenclature. The commonwealth was divided into clans called *gentes*, subdivided into families. Each citizen bore three names, viz.: the *prænomen*, which marked the individual; the *nomen*, which marked the gens; and the *cognomen*, which marked the family. Thus Publius Cornelius Scipio belonged to the Cornelian gens and the family of the Scipiones, while Publius was his individual, or what we now call Christian, name. Sometimes a fourth name, or *agnomen*, was given, generally in honor of some military success, as Publius Cornelius Scipio Africanus. There were only about thirty recognized *prænomina*. There were few surnames in England before the Norman invasion, and it was not at first common to transmit them from father to son. In the middle of the twelfth century it was thought essential that persons of rank should bear a surname. After the Reformation in England the introduction of parish registers contributed to give permanence to surnames.

Sons took their fathers' names first in the modified form of patronymics; thus, Priamides, son of Priam.

During the Middle Ages the Jews formed surnames with the Hebrew *ben* or Arabic *ibn*, meaning son, as Solomon ben Gabirol.

Among the Saxons we find in 804 Egbert Edgaring, *ing* denoting descent; and to this origin are attributed such names as Browning, Whiting. In Wales the surnominal adjunct *ap* was used in the same sense, as David ap Howell. Sometimes the father's name was taken in the possessive case, as Griffith William's, or as now written Williams. The prefix *mac* was used in a similar manner by the Gaelic inhabitants of Scotland and Ireland. The Irish also used for the same purpose *oy* or *o*, signifying grandson, as O'Hara, and the Normans *fitz* (a corruption of French *filz*, son), as Fitzroy; while the word "son" added to the father's name gave rise to a great number of names, as Adamson, Johnson. The use of hereditary surnames was established in England by the middle of the fourteenth century.

The law looks at the identity of the individual, not at the name. If one enter into a contract in a particular name, he may be sued in that name, whatever his own name may be. But in New York and Illinois persons trading under assumed names are required by law publicly to register the fact. Upon marriage, the legal surname of the husband and wife becomes that of the husband, yet she may continue to employ her maiden name in business without moral or legal censure. In many of the U. S. a name can be altered only by a judicial proceeding.

Na'mur, capital of province of Namur, Belgium; at the confluence of the Sambre and the Meuse; 35 m. SE. of Brussels; has an elegant cathedral and many good educational institutions, large breweries, and celebrated manufactures of cutlery and leather. It was formerly a very strong fortress; was taken by Louis XIV, 1692, and retaken by William III, 1695. Pop. (1907) 31,029.

Nana Sahib (nā'nā sā'hīb), abt. 1820-abt. 1860; Hindu chief; adopted son and heir of the Peisha of Poona, but not recognized by the British Govt., which refused to pension him; on the outbreak of the mutiny, 1857, turned traitor and took Cawnpur; had the English women and children butchered and their bodies thrown into a well. He continued the war in Oudh and other parts of the empire, but was never captured, and of his subsequent career nothing is known.

Nancy (nān-sē'), capital of department of Meurthe-et-Moselle, France; on the Meurthe, 35 m. S. of Metz; is the seat of a bishopric, and has a university, a celebrated school of medicine and pharmacy, a lyceum, several scientific societies, and other educational institutions, and large museums and collections for scientific and artistic purposes. It has manufactures of cotton and woolen goods, hosiery, hats, and brass, and its embroideries in all kinds of stuffs are celebrated. It was the capital of the former Duchy of Lorraine. Pop. (1906) 110,570.

Nankeen' (named from Nanking in China, the original place of manufacture), a durable cotton cloth of a buff-yellow color. It is made in Asia from a variety of cotton whose fiber is of this color (the *Gossypium herbaceum*). Ar-

tificially colored nankeens are made from ordinary cotton, and have nearly superseded the real article.

Nanking (nān-kīng'), name by which the capital of the province of Kiang-su is popularly known in China and among foreigners; on the S. bank of the Yangtze, 194 m. W. of Shanghai. Its walls, 30 ft. thick at the base and 70 ft. high in some places, have a circuit of about 20 m. It is the seat of the viceroy or governor general of the group of provinces known as Kiang-nan, and was formerly a city of much magnificence and importance. It was one of the chief literary centers and was noted (as it still is to some extent) for its manufactures of satin, crape, nankeen, paper, porcelain, and artificial flowers. The present city dates from the year 1368, when Chü-yuen-chang, a temple servant, at the head of a native army, overturned the Mongol dynasty, whose capital was at Pekin (the N. capital), and founded the Ming dynasty, which was in turn superseded, 1643, by the Manchus. He made it his capital (hence the name S. capital). On March 19, 1859, the city was taken by the Taipings, and was held by them until July 19, 1864, when it was captured by Gen. Gordon, and the rebellion came to an end. During their occupancy the palaces and other buildings erected in the early days of the Ming dynasty, including the famous Porcelain Tower, were completely destroyed. Pop. (1907) estimated at 267,000

Nansen (nān'sén), Fridjof, 1861- ; Norwegian explorer; b. near Christiania; made an expedition in a sealing ship to Arctic latitudes, 1882; appointed, same year, curator in the Natural History Museum at Bergen; crossed the continent of Greenland 1888-89; led a new expedition to the N. pole, 1893; on April 8, 1895, reached 86° 14' N., the highest latitude until then attained. After his return, 1896, was appointed Prof. of Zoölogy in Christiania Univ.; author of "The First Crossing of Greenland," "Eskimo Life," "Farthest North," "The Norwegian North Polar Expedition," etc.

Nantes (nānt), capital of department of Loire-Inférieure, France; on the Loire, 35 m. from its mouth; 248 m. SW. of Paris. The quays, boulevards, and promenades along the Erdre are elegant, and the city is regular and handsome. The most remarkable architectural monuments are the cathedral, built in the fifteenth century; the castle in which Henry IV signed the Edict of Nantes, and in which many of the French kings resided temporarily; the bourse, one of the finest of its kind in France; and the post office. The city has a lyceum, school of navigation, several commercial and industrial schools, library, botanical garden, museum of antiquities, and an art gallery. The principal industry is shipbuilding and the production of all articles necessary to the outfit of a vessel—anchors, cables, cordage, sailcloth, biscuits, preserved meat, etc. Pop. (1906) 133,247.

Nantuck'et Island, an island in the Atlantic Ocean; about 30 m. S. of Barnstable Co., Mass. With the small islands of Tucanuck, Muskeset, and the Gravel Islands, it forms the county of

Nantucket, which has an area of about 60 sq. m. Nantucket Island is of a triangular shape, about 15 m. long, and from 3 to 4 m. wide. The soil is sandy. Capital is Nantucket, a noted summer resort; has steamboat connection with New Bedford, Wood's Hole, and Martha's Vineyard. The town formerly had large whale-fishery interests, but is now principally engaged in the codfishery and the coasting trade.

Napata (nā-pā'tā), capital of the Ethiopian kingdom which grew to power between 900 and 700 B.C.; was located at the present Gebel Barkal (18° 30' N. lat.), somewhat below the fourth cataract of the Nile. The region was conquered by the Egyptians of the twelfth dynasty and was long governed as a province.

Naphtali (nāf'tā-lī), sixth son of Jacob, by Bilhah, the handmaid of Rachel. The tribe of Naphtali numbered 53,400 fighting men before Sinai, and 45,400 at the entrance into the promised country. It was settled in N. Galilee from the foot of Anti-Lebanon to Lake Genesareth; Kedesh was its principal town.

Naphtha (nāf'thā), term originally applied to a variety of pungent, volatile, inflammable liquids, chiefly ethers; it was then extended to rock oil, petroleum, etc. Subsequently the light oil of coal tar was called naphtha; more recently it has been again extended so as to include most of the inflammable liquids produced by the dry distillation of organic substances. In the U. S. it is applied to a series of hydrocarbons obtained from petroleum. The following are some of the naphthas known in commerce: (1) Boghead naphtha, obtained by distilling the Torbane Hill mineral or boghead coal at as low a temperature as possible; (2) bone naphtha, Dippel's animal oil; (3) coal naphtha, obtained by the distillation of coal tar; (4) mineral naphtha, from petroleum; (5) wood naphtha, pyroigneous ether, pyroxylic spirit, or methylic alcohol, a colorless, mobile, inflammable liquid, which burns with a faintly illuminating, bluish flame, and is miscible in all proportions with water, alcohol, ether, and ethereal oils. Naphtha dissolves the fixed and essential oils, sulphur, phosphorus, iodine, and the gums and resins. Hence it is used for removing grease from fabrics, in making varnishes, etc. It is highly explosive.

Naphthalene, a hydrocarbon found among the products of the destructive distillation of bituminous coal. It occurs in Rangoon petroleum and the tar of shale oil. It is formed by passing the vapors of several other carbons through a red-hot tube. Alcohol and ether vapor, and even ethylene and vapors of acetic acid, petroleum, essential oils, etc., yield some naphthalene when passed through red-hot tubes. Soot and lampblack contain naphthalene. Naphthalene is found in the tar formed from coal in the manufacture of gas and coke. It is found in that fraction of the tar which boils between 180° and 250° C. (350° and 480° F.)—that is, principally in the so-called "carbolic oil." From this it is separated by filtering and pressing between hollow plates heated by steam (hot pressing). The product obtained in this way is treated with caustic soda for the purpose of ex-

tracting phenols; then it is washed with dilute sulphuric acid at about 100° C. (212° F.). During this stage a small quantity of finely ground black oxide of manganese is added to the vessel for the purpose of removing the color. The purified hydrocarbon is washed several times with hot water, then with dilute alkali, again with hot water, and then sublimed or distilled.

Naphthalene appears in brilliant white, scaly crystals, very friable, strongly and unpleasantly odorous. In medicine naphthalene has been employed for antiseptic and disinfectant purposes, both internally and externally. Its specific gravity is 1.152. It melts at 174.5° F. (79.2° C.) and boils at 424.5° F. (218° C.). It sublimes at low temperatures and evaporates in the air. It is insoluble in cold and almost insoluble in boiling water, but dissolves readily in alcohol, ether, fatty and essential oils, and most oils (naphthas) obtained by destructive distillation in acetic and oxilic acids. The composition of naphthalene is represented by the formula $C_{10}H_8$, and, so far as its chemical nature is concerned, it is regarded as related to benzene, C_6H_6 . Naphthalene yields a great variety of derivatives, many of which have come into use on a large scale, especially in the manufacture of colors. Many of the derivatives of naphthalene exhibit beautiful and intense colors, but a few only have been found available as dyes.

Napier (nă'pī-er), **Sir Charles**, 1786-1860; British naval officer; b. Merchiston Hall; entered the navy at the age of thirteen; was made commander, 1807; distinguished himself in the W. Indies; served as a volunteer in the British army in Portugal; was engaged in the British naval operations in the Potomac and against Baltimore, 1814; accepted from Dom Pedro, 1833, the command of the squadron of the young Portuguese Queen; inflicted on the fleet of Dom Miguel a decisive defeat off Cape St. Vincent, July 5th, for which he was made Viscount St. Vincent in the Portuguese nobility and admiral in chief of the Portuguese navy; stormed Sidon with a land force in 1840; captured Acre; blockaded Alexandria; and concluded a convention with Mehemet Ali, for which services he was knighted. He commanded the Channel fleet, 1846-48; made vice admiral, 1853; commander of the Baltic fleet in the war with Russia, 1854; and captured Bomarsund, but refused to attack Cronstadt, and thereafter held no active command.

Napier, **Sir Charles James**, 1782-1853; British military officer; b. London; fought in the Irish rebellion; was wounded and left for dead in the battle of Corunna, 1809; engaged in expeditions against the coast of the U. S., 1813; Governor and military resident of Cephalonia, 1822-30. He conquered Sind and governed the province, 1842-47; was again sent to India as commander in chief, 1849, but found the Sikhs already beaten.

Napier, **John**, 1550-1617; Scottish mathematician; b. Merchiston Castle, near Edinburgh; son of Sir Archibald Napier, Master of the Mint; published, 1593, "Plain Discovery of the Whole Revelation of St. John," directed against popery; though a strict Presbyterian, was ap-

parently a believer in astrology and divination. In 1614 he published his great discovery of logarithms, which, according to Kepler, he had indicated as early as 1594, and, 1617, another volume detailing the invention of Napier's Bones. A second work on logarithms appeared after his death. Archibald, his eldest son, was created Lord Napier, 1667, and was ancestor of several Napiers of military and naval celebrity.

Napier of Mag'dala (**ROBERT CORNELIS NAPIER**, Baron), 1810-90; British military officer; b. Ceylon; entered the Royal Engineers, 1826; served in the Punjab campaign, 1848-49; commanding engineer of the right wing at the battle of Gujrat, and pursuit of the Sikh army; actively engaged throughout the Indian mutiny campaigns, 1857-58; chief engineer at siege and capture of Lucknow. He commanded a division in the China expeditionary force and distinguished himself in the campaign resulting in the surrender of Peking; lieutenant general, 1867; commanded the Abyssinian expedition resulting in the capture of Magdala; raised to the peerage, 1868, as Baron of Magdala; Governor and commander in chief of India, 1870-76; Governor of Gibraltar, 1876-82.

Napier's Bones, set of tablets of bone, horn, ivory, or other material, invented by John Napier for facilitating multiplication and division. They are interesting only as a mathematical curiosity.

Na'ples, largest city of Italy; capital of province of Campania, and formerly of the Kingdom of the Two Sicilies; on the Bay of Naples. It is magnificently situated, rising like an amphitheater from the shore, and has an almost perfect climate. The city is dominated on the W. by the Castle of St. Elmo, which crowns the hill of St. Erasmo or St. Ermo; on the seaside are the fortresses of Castel Nuovo and the Castel del' Ovo, probably built by the Norman William I (1150); also many batteries. There is regular steam communication by water between Naples and all the principal Mediterranean ports, and railways connect it with central and N. Italy. It is divided into the Old, or E., and the New, or W., town by a ridge extending from the Palace of Capodimonte to the sea, thus dividing the city into a kind of double crescent. Manufactures, numerous though individually unimportant, include: macaroni, woollens and cottons, silks, ornaments, gloves, soap, and perfumery.

In the sacristy of the Cathedral of San Gennaro is the almost priceless treasury of the saint; here also are the ampole or small phials said to contain the blood of St. Gennaro, which is believed to liquefy twice every year. Among other prominent churches are the Incononata, founded by Joanna I, Sta. Chiara, with fine frescoes and curious old monuments; San Domenico Maggiore, very rich; the Church of the Gerolomini, one of the finest in the city, and San Francesco di Paolo, which has a cupola of great size. The National Museum, formerly known as the Museo Borbonico, is one of the most extensive and most interesting in the world. The National or Farnese Library

contains over 250,000 volumes, besides 8,000 valuable manuscripts; the Brancacciana has over 100,000 volumes; and 150,000 volumes belong to the library of the university, founded, 1224, and attended by 4,700 students, the zoölogical station, including a marine aquarium and laboratory, connected with the university, is said to be the most perfectly organized in the world. Among the many objects of interest in the immediate vicinity of Naples is the grotto of Posillipo, over the E. entrance of which is the reputed tomb of Vergil.

Naples is said to have been founded as an offshoot of the still older town, Parthenope or Palæopolis, the site of which was probably Posillipo. The city first appears in history as an ally of Rome against the Samnites. Eventually it became the favorite resort of the Roman aristocracy. It was besieged and taken, 537, by Belisarius, and later by Totila. Still later it became the capital of a dukedom. In 1037-1194 it was in the hands of the Normans. The Suabian dynasty followed, but, 1268, the pope bestowed the Kingdom of Naples on Charles of Anjou. In 1442 Alfonso of Aragon besieged and captured the city. In 1495 Naples opened her gates to Charles VIII of France, who, however, was soon forced to share his prize with Spain. Francis I vainly endeavored to recover it from his rival, Charles V. In the siege of 1528 both besieged and besieger suffered cruelly from plague and famine. Religious persecution and the most intolerable despotism finally brought abt., 1647, the famous insurrection of Masaniello. Not long after a terrible plague appeared, during which 30,000 persons perished in six months. During the wars of the French Revolution, Naples was several times taken, lost, and retaken by the French. In 1815 the Bourbons were once more restored; the citizens endeavored to obtain reforms, but were sternly repressed until 1860, when, September 7th, Garibaldi entered the city, and the people voted for the annexation of Naples to the constitutional kingdom of Victor Emmanuel II. Pop. (1907) 563,540.

Naples, Bay or Gulf of, portion of the Mediterranean, on the SW. coast of Italy, running inland about 10 m. between Cape Miseno and Cape Campanella, 20 m. distant from each other. Its shores have a world-wide reputation for beauty of scenery and charm of climate.

Naples, King'dom of. See ITALY.

Napo (nā'pō), N. branch of the upper Amazon, in Ecuador; rising on the E. slope of the Andes, SE. of Quito, flowing SE. by E., and joining the Amazon near lon. 72° 45' W.; length, by the principal windings, nearly 800 m.; navigable for small steamers about 500 m.; principal tributaries the Curaray, Aguairico, and Coca. Peru claims the Lower Napo, and the entire N. shore is in territory claimed by Colombia.

Napo'leon I, 1768 or 1769-1821; soldier, statesman, and Emperor of the French; b. Ajaccio, Corsica, date uncertain; if he was born in 1768 he was a Genoese; if in 1769, a

Frenchman. His father, Carlo Bonaparte, was descended from an Italian family of rank; his mother, Letizia Ramolino, was a Corsican. In 1779 Napoleon secured a free cadetship at the military school of Brienne; in 1784 he was transferred to the military academy at Paris. During this time he attracted attention chiefly by his talent for mathematics, by the clearness and power of his perception, and by the imperturbability of his temper. In 1785 he was made a sublieutenant of artillery of the army under the Convention; in 1793 was made captain, and later in the same year went as sublieutenant with the forces sent to regain Toulon from the English, to whom it had surrendered. The evacuation of the port was attained chiefly through the skill of Napoleon, and he was, in consequence, made brigadier general, 1794. When the mob of Paris rose against the Convention, he was given command of the troops to defend the Convention against the Royalists, and showed himself master of the city by sweeping the streets with grape-shot, disarming the populace, and driving the Royalists into seclusion. He thus practically brought the Revolution to an end. The Constitution of 1795, called the Constitution of the Year III, immediately went into effect, and under this Constitution the executive power was vested in five persons, styled the Directory. In March, 1796, he married Josephine de Beauharnais.

The coalition which had been formed against France in 1793 was broken up by the revolt by Poland and the withdrawal of Prussian troops from the W. In 1794 France regained all she had lost, expelled the Austrians from Belgium and the Stadtholder from Holland, set up her boundary on the Rhine, and pushed her armies into Germany. This act of conquest led to the coalition of Russia, Austria, and Great Britain in 1795. Bonaparte saw that the most formidable enemy was Austria and the most vulnerable point of attack was the Austrian territory in Italy. He urged his views so cogently upon the Directory that on March 27, 1796, he was given command of the Italian campaign. His plan was to separate the Austrian from the Sardinian army and defeat them both in turn. In less than a month he fought five decisive battles and was in complete possession of the W. part of N. Italy. By the Peace of Campo Formio (October 17, 1797) Austria ceded her Belgian provinces to France, recognized the French political creations in Italy, and received from France the Republic of Venice. On Napoleon's return to France he proposed an invasion of Egypt as a means of attacking the commerce and power of England in the E., and May, 1798, set out from Toulon in command of 30,000 men. On July 2d he landed at Alexandria, and on July 21st overthrew the Mamelukes in the battle of the Pyramids, which opened to him the gates of Cairo, and made him master of Egypt. While thus engaged his fleet, anchored at the mouth of the Nile, was destroyed by Nelson (August 1, 1798). Thus deprived of the means of return, he advanced into Syria, but received a check at the port of Acre, defended by the Turks and a body of English marines under Sir Sydney

Smith. He returned to Egypt, and later in the year contrived to run the blockade, and landed at Fréjus, October 9, 1799.

On his return to France he was met with universal acclaim. He found France in a state of disorder, and had little difficulty in convincing the Directory that it was time for a change of government. On the 18th Brumaire (November 9, 1799) the famous *coup d'état* took place which swept away the Constitution of the Year III, and placed Bonaparte in power. The new government was soon obliged to renew the war against Great Britain, Russia, and Austria, and Napoleon went again into Italy. He defeated the Austrians at Marengo and Hohenlinden, and was about to march upon Vienna when peace was made at Lunéville (February, 1801), confirming the provisions of Campo Formio in regard to the French frontier, but practically destroying the power of Austria in Italy. Treaties were subsequently concluded with Spain, Naples, the pope, Bavaria, Portugal, Russia, and finally the Treaty of Amiens, with Great Britain, was signed, March, 1802, Great Britain consenting to the French status N. of the Alps, but refusing to acknowledge the republics in Italy. In 1802 Napoleon was proclaimed consul for life, and in 1804 had himself crowned emperor. To this period belongs the famous body of laws known as *Code Napoléon*.

In 1805 Great Britain, Russia, Austria, and Sweden united against Napoleon, who marched at once across Bavaria and compelled Austria to capitulate at Ulm (October 20th), and by the Treaty of Presburg cede all her possessions in the Tyrol. On November 13th he entered Vienna, and December 2d routed the allied Russian and Austrian armies at Austerlitz, but his project of invading Great Britain was thwarted by the annihilation of his fleet by Nelson at the battle of Trafalgar. In order to consolidate his power, Napoleon placed his brother Joseph on the throne of Naples, created his brother Jerome King of Westphalia, his brother Louis King of Holland, and raised other members of his family to positions of influence. This brought about a collision with Prussia; war was declared, October 8, 1806, and Prussia was defeated at Jena and Auerstädt, October 14th. On October 25th Napoleon entered Berlin and issued the famous Berlin Decrees, directed against British commerce. Then he marched N. against the Russians, who were advancing to assist the Prussians, and defeated them at Friedland. On July 7th the Peace of Tilsit was concluded, by which the King of Prussia received back half his dominions.

Having secured the confederation of the Rhine, after the Austerlitz campaign, Napoleon sent Murat into Spain and Portugal with a similar purpose, Portugal having defied the Berlin Decrees. This commenced the Peninsular War, which lasted seven years, when the French were finally driven across the Pyrenees, 1814. As soon as the magnitude of the Spanish war revealed itself, signs of difficulty again appeared in the E., and as formerly, the most serious source of trouble was Austria, who had so far recovered from

the Austerlitz disaster as to be able to put nearly 400,000 men in the field. The French army was widely scattered, and the movements which extricated the French from their positions constitute one of the most remarkable of Napoleon's military exploits. At the battle of Wagram the French were finally victorious, and the Austrians retreated, completely humiliated. The great significance of the Treaty of Schönbrunn, signed October 14, 1809, was the fact that by it Russia was converted into an enemy. On his return to Paris Napoleon divorced Josephine, and in April, 1810, married the Archduchess Maria Louisa of Austria. On May 11, 1811, the King of Rome was born.

The years of 1810 and 1811 were the period of Napoleon's greatest power; he annexed Holland and Westphalia, and extended the N. maritime border. These events convinced Russia that there was no possibility of peace except by crushing Napoleon's power or by acknowledging a Napoleonic suzerainty over the whole of W. Europe. In May, 1812, Napoleon declared war against Russia, and soon invaded that country with about 500,000 men. The Russian campaign was a complete failure, owing to the severe winter and the devastation of the land by the Russians as they retreated before the French. When the French finally reached Moscow they found it in flames, and there was nothing for the French to do but retreat. The disasters of the Russian campaign seemed to precipitate the distrust and discontent now everywhere prevalent, and the levies for the Russian campaign had drained the country of able-bodied men. On the other hand, both Prussia and Austria, encouraged by Napoleon's failure in Russia, after overtures of peace, which Napoleon refused, began to take measures to oppose him, and in 1813 formed a new coalition. The campaign which followed was for a long time without decisive result. The battles of Lützen, Bautzen, and Dresden gave Napoleon some advantage, but were not decisive, and finally his army was badly defeated at Leipzig by the allied forces of Austrians, Bavarians, Prussians, and Swedes (October 19th).

After this disastrous battle Napoleon moved slowly back to the Rhine, fighting a defensive campaign. Austria attempted to negotiate peace on basis of natural boundary of the Rhine, but Napoleon was unwilling to abandon Germany, and so lost the last chance of saving Holland, Belgium, Cologne, Metz, and Mannheim. As the Austrians reached the Seine, and were advancing toward Paris, Napoleon threw himself upon the enemy's rear and called for reinforcements from the fortresses along the Rhine. This left the way to Paris open to the allies and, led by Talleyrand, they marched directly on the capital. Napoleon immediately sent an embassy to treat for peace, but the allies would not treat with Napoleon. His corps of 20,000 deserted him, and the senate proclaimed that he had forfeited his crown. Seeing that the contest could not longer be carried on without civil war he abdicated, April 6, 1814. The Allies decided to place the Comte de Provence on the throne as Louis XVIII, and banished Napoleon to the Island of

Elba. Almost immediately after his departure France was thrown almost into a state of revolution, and Napoleon conceived the time fitting for his return. He was received by the French with moderate enthusiasm, but immediately Great Britain, Prussia, Russia, and Austria again united against "the disturber of the peace of the world." The campaign began June 12, 1815; on June 16th he defeated Blücher at Ligny, while Ney held the British in check at Quatre-Bras, and on the 18th he was defeated at the battle of Waterloo, after which there was again nothing left for him but abdication. He proclaimed his son Napoleon II, but notwithstanding this fact a provisional government was set up. On July 15th he placed himself under the flag of Great Britain and was received on board the *Bellerophon* with high honors, but later was sent to St. Helena an exile. He died May 5, 1821, and was buried at St. Helena, but his remains were removed to Paris in 1840.

Napoleon II (FRANCIS JOSEPH CHARLES), 1811-32; only child of Napoleon I by Marie Louise of Austria; b. in the Tuileries, and baptized as King of Rome. After the defeat at Waterloo, Napoleon I abdicated in favor of his son, and proclaimed him emperor of the French, 1815, under the title of Napoleon II, but the Allied Powers paid no attention to this proclamation. He was educated in Vienna, where he was known as the Duke of Reichstadt, from a small estate in Bohemia, and was instructed in military science. As Napoleon III ascended the French throne, the Duke of Reichstadt is reckoned among the French sovereigns by the Bonapartists and known as Napoleon II, though he never occupied the throne.

Napoleon III (CHARLES LOUIS), 1808-73; French emperor; b. Paris; youngest son of Louis Bonaparte, King of Holland and Hortense Beauharnais, stepdaughter of Napoleon I; was educated at Augsburg and Thun, Switzerland; joined in the unsuccessful revolt against the papal rule in Romagna, 1830-31; after the death of his elder brother, 1831, and of the Duke of Reichstadt, 1832, became the heir of the house of Bonaparte; was proclaimed emperor at Strasbourg, 1836, as the result of a conspiracy, but was arrested and sent to the U. S. without trial. In 1837-39 he lived in London; 1840, landed at Boulogne with fifty men, but failed to secure adherents, and was sentenced to imprisonment for life, and remained in the citadel at Ham till May 25, 1846, when he escaped. While in prison he wrote "On the Extinction of Pauperism"; had previously published "Political Reveries" and "Napoleonic Ideas," pamphlets. After living in London, 1846-48, he returned to France, was elected to the Assembly from Paris, and from three departments; December 20th was elected president of the republic by a majority of over 5,000,000. Quarrels with the Assembly led him to seize the power by the *coup d'état* of December 2, 1851, aided by the army; carefully circulated reports persuaded the people of the provinces that Paris approved of his course, and December 20th-21st he was chosen president for two years.

On December 2, 1852, he was proclaimed emperor, a large popular vote having been cast; January 30, 1853, married Eugénie de Montijo, who bore him the Prince Imperial. (See NAPOLEON IV.) The Crimean War, 1854-56, though immensely expensive, added to the military reputation of France, and the Italian War, 1859, in which he led a large army, made him popular. The Mexican War, 1862-63, brought France no glory; in the Danish War, 1864, and the War of 1866 Napoleon's policy was so weak and inconsistent that its results were humiliating to France. The war with Germany, 1870, was due to his desire to strengthen the empire, and to forestall a popular uprising against him. Ignorant as to the resources of France and her readiness for war, he made the venture; was taken prisoner at Sedan, September 2, 1870, with his entire army, and was sent to the castle of Wilhelmshöhe, near Cassel, whence he afterwards removed to England, where he died (at Chislehurst). Among Napoleon's other writings are "History of Julius Cæsar" and "Works of Napoleon III."

Napoleon IV (so called by the Bonapartists), PRINCE LOUIS NAPOLEON, 1856-79; only child of Napoleon III and the Empress Eugénie. When, September 4, 1870, the people of Paris, after the battle of Sedan and the downfall of Napoleon III, proclaimed the republic, he escaped with his mother to England. He received a military education at the Royal Military Academy at Woolwich. During the war against the Zulus, S. Africa, he volunteered his services, and was killed.

Nara (nā'rā), ancient town of Japan; province of Yamato; about 27 m. S. by E. of Kyoto. For seven reigns (709-784 A.D.) Nara was the imperial seat, and retains, in its wonderful old temples, relics of its past glory. In a pagoda is contained the largest image of the Great Buddha in the empire, 53 ft. in height. Modern Nara is noted for its cutlery and its park, where is kept a herd of tame sacred deer. Pop. (1904) 33,735.

Naraka (nār'ā-kā), in Brahmanism and the religious systems developed from it, the place to which the wicked are consigned for punishment; hell. Manu enumerates twenty-one such places. According to the Buddhist system there are eight large hot hells, eight large cold hells, eight large hells of utter darkness, and ten large cold hells on the edge of the universe. Each of these has innumerable smaller hells attached to it. All these hells are in charge of Yama, the judge of the dead, who, with the assistance of eighteen officers and an army of demons, determines the kind, degree, and duration of torture to which each male culprit must be subjected. His sister performs the same duties in regard to female culprits.

Narbada (nār-bā-dā'). See NERBUDDA.

Narbonne (nār-bōn'), ancient *Narbo Martius*, town of Aude, France; on a branch of the Canal du Midi; 8 m. from the Mediterranean; known to the Greeks 500 B.C. In 118 B.C. it was colonized by the Romans, and in the times

of the emperors became a magnificent city and capital of Gallia Narbonensis. In the twelfth and thirteenth centuries it was a city with 40,000 inhabitants and extensive commercial connections. Its only celebrity at present is due to its honey, the best in France. Pop. (1901) 24,807.

Narcis'sus, beautiful son of the Boeotian river god Cephisus and the nymph Liriope. The nymph Echo loved him, but he repulsed her, and was punished by falling in love with his own image as reflected in a fountain, so that not attaining the beloved image he pined away and died. When the Naiads came to bury his body, they found only a flower—the narcissus.

Narcissus, name of a genus of bulbous plants of the family *Amaryllidaceæ*, natives of the



POETS NARCISSUS.

Old World. The genus includes the garden and greenhouse plants called jonquil, narcissus, daffodil, and polyanthus. Daffodils are among



DAFFODIL.

the first flowers of spring, and are found everywhere in old gardens.

Narcot'ics, in medicine, such drugs as have the power of stupefying the cerebral faculties, or inducing sleep, or deadening ordinary sensibility. Such drugs as opium, belladonna, stramonium, henbane, Indian hemp, chloral, and the ethers are those to which the term is commonly applied. See POISONS; TOXICOLOGY.

Nard. See SPIKENARD.

Nares (närz), Sir George Strong, 1831–1915; British navigator; b. Danestown, Scotland; entered army, 1845; vice admiral, 1892; member Arctic expedition, 1852–54; commanded the *Challenger* in scientific exploration, 1873–74; headed Arctic expedition in the *Alert*, which reached lat. 82° 37' N., 1875–76; professional member, Board of Trade, 1879–96; author of "The Naval Cadet's Guide," "Reports on Ocean Soundings and Temperature," and official reports of his Arctic voyages.

Narragan'sett Bay, inlet of the Atlantic, extending 28 m. into Rhode Island; is deep and well sheltered from the sea; receives the estuaries of the Providence and Taunton rivers; and contains the islands of Aquidneck (or Rhode Island proper), Conanicut, Prudence, and other smaller ones.

Narses (när'séz), abt. 478–573; military officer under Justinian I; b. Persarmenia, was a eunuch and slave in the palace of the Byzantine emperors; made keeper of the privy purse and member of the council; became commander in chief in Italy, 552. Having crushed the power of the Goths in Italy, he was made governor of that country with the title of exarch; but after the death of Justinian and the accession of Justin II, he was deprived of his office, 565, and retired to Rome.

Nar'thex, vestibule or inclosed porch extending across the whole front of a church. In the early Christian and Byzantine churches it was commonly vaulted, and entered from the atrium or forecourt by a number of doors corresponding with those leading into the church proper. The unbaptized and heretics were not allowed to pass beyond the narthex into the church. The most magnificent examples of the narthex are those of Santa Sofia at Constantinople and St. Peter's at Rome.

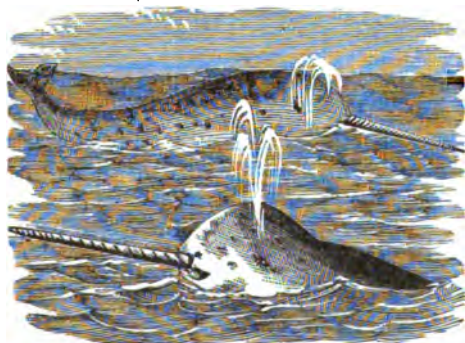
Nar'va, fortified town of Russia; on the Narova; 80 m. SW. of St. Petersburg; had much commerce previous to the foundation of St. Petersburg, and still has active fisheries and manufactories of lumber and nails. Near this town, November 30, 1700, Charles XII with 8,500 Swedes defeated more than 50,000 Russians under Peter the Great. Pop. (1897) 16,557.

Narvaez (när-vä'èth), Pamfilo de, abt. 1480–1528; Spanish explorer; b. Valladolid; served in Santo Domingo, Cuba, and Mexico, whither he was sent to reduce Cortes, but was himself defeated by him and imprisoned for five years; then went to Spain, obtained a grant of Florida, and sailed with a large force, 1527. He landed at Tampa Bay, April 16, 1528, and marched to Apalachee; but the country not

being tempting, endeavored to reach Mexico, and perished at sea, while most of his force sank under hardship or hostilities. His treasurer, Cabeça de Vaca, and others reached Sonora, 1536. His accounts led to the exploration of New Mexico and California.

Narvaez, Ramon Maria (Duke of Valencia), 1800-68; Spanish statesman; b. Loja; in the first Carlist War attained post of captain general of Old Castile; took part in an attempted revolution against Espartero, 1839, and had to take refuge in France. In interest of ex-Queen Maria Christina he headed an expedition which penetrated to Madrid, 1843, and overthrew the government of Espartero. In the following year he became prime minister, field marshal, Count of Cañadas Altas, and Duke of Valencia, and effected the formation of a new constitution, 1845. In 1846 he quarreled with the ex-queen, resigned his post, and went as ambassador to France; resumed power, 1847, but soon lost it again for the same reason as before; became again prime minister, 1856; repressed several revolutionary outbreaks; was overthrown, 1857; again prime minister, 1864-65, and from July, 1866, till his death.

Nar'whal, or Sea U'nicorn, cetacean (*Monodon monoceros*) belonging to the family of the *Delphinidae* or dolphins; with the white whale forms the subfamily *Delphinapterinae*. Many



NARWHAL.

of the members of the order never develop teeth, but the male narwhal has a tooth or tusk 6-8 ft. long on the left side of the upper jaw. The corresponding tooth on the right side generally remains hidden within the jaw, but sometimes is produced symmetrically with the other.

Na'sals, class of speech sounds characterized by the opening of the nasal passages. The term in its narrower use applies to the common sounds of *n*, *m*, *ng*, the dental, labial, and palatal nasals respectively. These are formed by making with the tongue or lips the closures for *d*, *b*, or *g* respectively, and deflecting the voiced breath through the nasal passages.

Nas'cent State, in chemistry, a state in which, at the instant of evolution from previous combination, some substances manifest tendencies to combine directly with, and even

to decompose, bodies upon which in ordinary circumstances they are inactive. The most familiar and the most remarkable examples of this class of phenomena are exhibited by the element hydrogen.

Nase'bury. See SAPODILLA.

Nase'by, village of Northampton, England; 12 m. NNW. of Northampton. Here, June 14, 1645, the army of King Charles, barely 7,500 in number, with Prince Rupert on the right wing and Sir Marmaduke Langdale on the left, attacked the Parliamentary forces, nearly 14,000 strong, under Cromwell, Fairfax, and Ireton. Ireton was routed by Prince Rupert, but Cromwell routed Langdale, and finally attacked the royal center in the rear and gained the battle. The Parliamentary army lost about 1,000; the royal army about 5,300, of whom some 4,500 were made prisoners.

Nash, Richard, known as BEAU NASH, 1674-1761; English leader of fashion; b. Swansea, Wales; became famous as a diner-out, a gamester, and leader of fashionable dissipation, and, 1704, undertook the management of the balls at Bath. For fifty years he was master of ceremonies, acquiring a wide notoriety for his strictness in enforcing decorum in the midst of gayety and dissipation, and was popularly called "the king of Bath." He made his living chiefly by gaming, and was noted for generosity.

Nash, Thomas, 1561-1601; English dramatist; b. Lowestoft, Suffolk; aided Marlowe in writing "Dido, Queen of Carthage," and produced a spectacle styled "Summer's Last Will and Testament," exhibited before Queen Elizabeth, 1592; but his plays were ill received, and he described his forlorn condition in his "Pierce Penniless, his Supplication to the Divell" (1592). In 1597 he produced a satirical play called "The Isle of Dogs," the representation of which led to his imprisonment.

Nash'ua, one of the capitals of Hillsboro Co., N. H.; on the Nashua River, near its junction with the Merrimac; 35 m. S. of Concord; noted since 1826 for its manufactures, for the promotion of which superior water power was obtained from the rivers by a canal; principal manufactures, cotton goods, sheetings, embroidery, iron and steel, foundry products, furniture, edge tools, paper, and locks. Pop. (1910) 26,005.

Nash'ville, capital of State of Tennessee and of Davidson Co.; on Cumberland River; 233 m. ENE. of Memphis; is on a rocky foundation, the river bluffs rising 80 ft. above low water. The city contains Vanderbilt Univ., Peabody Normal School, Montgomery Bell Academy, Univ. of Nashville, Univ. of Tennessee, St. Cecilia Academy, Boscobel Female College, Ward's Seminary for Young Ladies, Belmont College for Young Ladies, Tennessee Industrial School; and, for colored people, Central Tennessee College, Fisk Univ., Roger Williams Univ., Meharry Medical College, and Walden Univ. The city contains the State

Institution for the Blind, State Penitentiary, U. S. Govt. building (cost \$1,000,000), and the headquarters of the Tennessee Historical Society, Tennessee Confederate Memorial and Historical Association, and Engineering Association of the South. Nashville is a leading lumber market, and manufactures lumber products extensively, also flour and grist, fertilizers, boots and shoes, carriages, cotton and woolen goods, iron products, etc., the capital employed being about \$28,000,000. The city is an important market for grain, corn, cotton, bacon, bulk meats, and boots and shoes. The first permanent settlement at Nashville was made, 1779-80, and the town was incorporated, 1784, and received a city charter, 1806. The legislature met here, 1812-15, when its seat was transferred to Murfreesboro; but since 1826 it has sat at Nashville, which was made the permanent capital of the state, 1843. Pop. (1910) 110,364.

Nashville, Bat'tle of, battle of the Civil War in the U. S.; fought, December 15-16, 1864, between Union forces under Gen. George H. Thomas and Confederates under Gen. John B. Hood. After the battle of Franklin, Gen. Thomas concentrated his forces at Nashville, Tenn., which was well fortified with field works on the low hills, surrounding the city on the S., with both flanks resting on the Cumberland River. Gen. Hood took up a position in his front. Thomas attacked on the 15th, turned Hood's left, carried lines from left to right, and drove him back to a new position about 2 m. to his rear. On the 16th Thomas again attacked, and by turning Hood's left, swept him from his new line, and drove him from the field in disorder. The Confederates crossed the Tennessee at Decatur, December 27th, and fell back to Tupelo, Miss., where the remnant of the army was dispersed and sent to different fields. The total Union loss was 3,057, of whom less than 400 were killed. The Confederate loss was probably about the same. There were captured on the field about 4,500 prisoners, including four generals, besides fifty-four guns.

Na'smyth, James, 1808-90; British inventor; b. Edinburgh; carried on extensive machine works in Manchester; invented the steam hammer, steam pile driver, and a new and effective kind of ordnance, and constructed powerful telescopes; with James Carpenter, published "The Moon considered as a Planet, a World, and a Satellite."

Nasr-ed-din (nās'r-ēd-dēn'), 1831-96; Shah of Persia; succeeded his father Muhammad, 1848; principal events of his reign: his defeat in the war with England, 1856-57; a famine which desolated a large portion of the country, 1871, and his visit, 1873, to European courts; wrote an amusing diary of his tour; died by assassination.

Nassau (nās'sou), Adolphus William Charles Augustus Frederick (Duke of), 1817-1905; assumed the sovereignty of Nassau, August 20, 1839. His state was joined to Prussia, 1866, and he received over 15,000,000 gulden as in-

demnification. On the death of the King of the Netherlands, November 23, 1890, he became Grand Duke of Luxemburg.

Nassau, Joan Mauritz van (Count of Nassau-Siegen), commonly called MAURITZ or MAURICE OF NASSAU, 1604-79; Dutch military officer and administrator; b. near Delft; early fought against the Spaniards and particularly distinguished himself at the siege of Breda, 1625; was governor general of the Dutch possessions in Brazil, 1637-44; gained a brilliant victory over the Spanish and Portuguese fleet, January, 1640, and was able to send expeditions against the Portuguese in Africa and the Spanish on the Rio de la Plata. After his return he was lieutenant general of cavalry, and after 1647, Governor of Cleves; 1652, was made a prince of the German Empire. As commander of the Netherlands army, 1665, he repulsed the invading army of the Bishop of Münster. He defended the frontier, 1672, and was prominent in the campaign of 1674 in the Spanish Netherlands.

Nassau, part of province of Hesse-Nassau, Prussia; before 1866 an independent duchy of Germany, with area of 1,800 sq. m. and pop. of 468,311. The country, extending along the Rhine, Main, and Lahn, and traversed S. by the Taunus and N. by the Westerwald, is beautiful and rich. The mountains contain iron, lead, copper, coal, marble, and building stone. The valleys produce wheat, tobacco, flax, and fruit of superior quality, and grapes from which are made the choicest Rhenish wines. The mineral springs are famous; the watering places built around them, such as Wiesbaden, Ems, and Selters, are visited by people from all parts. In the thirteenth century the ruling family split into two branches, called after the brothers Walram and Otho; the Walram line obtained the title of Dukes of Nassau by the formation of the Rhenish confederacy in 1806, and their troops fought under Napoleon. In 1866, when the war between Prussia and Austria broke out, the duke openly supported the latter; the Prussians overran the duchy, and, October 3d, Nassau was incorporated with Prussia.

Nassau (nās'ā), town of island of New Providence, and capital of the Bahama Islands; has a good harbor, is fortified and well built, and is celebrated for its salubrious climate. Pop. abt. 10,000.

Nast, Thomas, 1840-1902; American artist; b. Landau, Bavaria; removed to the U. S., 1846; went to Italy, 1860, followed Garibaldi, and executed sketches of the war for the *New York Illustrated News*, the *Illustrated London News*, and *Le Monde Illustré*, of Paris. In 1862 he began a series of sketches in *Harper's Weekly*, and for many years was the chief caricaturist on that journal. In 1866 he executed for the *Bal d'Opéra* in New York City sixty caricatures of prominent politicians, editors, artists, and actors. He edited *Nast's Illustrated Almanac* and *Nast's Weekly*, and gave many public lectures, illustrated with pictures drawn in the presence of the audience. He was appointed consul to Guayaquil, Ecua-

dor, 1902, and died there of yellow fever a few months after his arrival.

Nasturtium, name of a genus of cruciferous herbs, mostly aquatic, containing many species, among which are water cress and horse-radish. Popularly, the name nasturtium is given to



NASTURTIIUM.

Tropaeolum majus, a fine, showy, climbing herb, a native of Peru, often seen in gardens.

Natal (nä-täl'), province of the Union of South Africa, extending along the Indian Ocean from about lat. 26° 30' to 31° S.; includes Tongaland, Zululand (annexed, 1897), and the N. Districts (Vryheid, Utrecht, and part of Wakkerstroom), formerly belonging to the Transvaal, and annexed, 1903; original area, 17,979 sq. m.; present area, about 35,371 sq. m.; pop. (1907) 1,164,285; capital,

Pietermaritzburg. The climate is healthful; coal, iron ore, gold, copper, asbestos, and graphite are found; hides and skins, sugar, coal, wood, gold, and bark are exported. The port is Durban. Natal was annexed to Cape Colony, 1844, and made a separate colony, 1856; merged in the Union of South Africa, 1910.

Natchez (näch'ez), capital of Adams Co., Miss.; on the Mississippi River; 100 m. SW. of Jackson; settled by the French, 1716; settlers massacred by Indians, 1729; occupied by the English, 1763-79, and by the Spanish, 1779-98; made capital of the Territory of Mississippi, 1798; became a city, 1803; and in Civil War was captured by Farragut. The business part of the city is a narrow stretch of river bank, and the larger part, occupied by public buildings and residences, is the summit of a bluff 150 ft. above the river. The city handles over 50,000 bales of cotton annually, and has steam saw, planing, grist, and cotton mills, cotton-seed oil factory, steam gineries, iron foundries, ice factory, and other manufactories. Notable institutions include U. S. Marine and State Hospitals, Stanton College, Fisk Library, and Natchez Institute. Pop. (1910) 11,791.

Naticidae, family of Gasteropod molluscs containing numerous species, with globular shells, occurring in the shallow seas and on the shores of the ocean in all parts of the world. The naticas, or sea snails, have a very large, fleshy foot; the shell has the aperture rounded in front and pointed behind. These animals are voracious, feeding upon other molluscs, which they kill by rasping holes in the shell with their ribbonlike tongue. The members of one species lay their eggs in those curved bands known to people on the shore as sand saucers.

National Cemeteries, cemeteries for the interment of U. S. soldiers who have fallen in

battle. These, seventy-two in number, and situated in nearly every state in the Union, contain more than 316,000 graves, 18,000 of which are in the cemetery at Arlington, Va.

National Civic Federation, American organization, nonpartisan in principles, organized, 1902, by prominent representatives of capital, labor, and the general public. Its objects are the study and discussion of questions of national import and the promotion of legislation in behalf of needed reforms. The executive committee, of thirty men representing the principal occupations, directs work through the National Ownership Commission of 100 members, which, 1906-7, investigated municipal ownership in the U. S. and Europe; the Immigration Department; the Industrial Economic Department, which aims to solve such problems as wages, the open and closed shop, and the trusts; the Conciliation Department, which has to do with strikes, lockouts, and trade agreements; the Welfare Department, which strives to better the conditions under which workingmen and women labor and live; the Primary Election and Ballot Reform Department, organized to awaken and stimulate interest in national, state, and local politics.

National Debt. See DEBT, PUBLIC.

National Education Association. The object of this association is stated in the preamble of its constitution to be "to elevate the character and advance the interests of the profession of teaching, and to promote the cause of education in the U. S." From 1857, the date of its organization, to 1870, this body was known as the National Teachers' Association; from 1870 to 1886, as the National Educational Association. In 1886 it was incorporated under the laws of the District of Columbia as the National Education Association, the name being changed later in the year to National Educational Association; 1906, by special act of Congress, it was incorporated as the National Educational Association, the present organization being effected in 1907. It has held annual meetings, with the exception of the years 1861, 1862, 1867, 1878, and 1906. There are three classes of members—active, associate, and corresponding. The association was, by its act of incorporation, divided, for working purposes, into the National Council of Education and the following seventeen departments: Superintendence, normal schools, elementary education, higher education, manual training, art, kindergarten, music, secondary, and business education; child study, physical education, natural science instruction, school administration, library, special, and Indian education. To these have since been added the departments of technical education, of rural and agricultural education, and of national organization of women. In 1908 the permanent fund amounted to \$170,000. A permanent secretary is employed, who devotes his time exclusively to furthering the interests of the organization. The N. E. A. (the common abbreviation for the National Education Association) is, so far as known, by far the largest organization of teachers in the world. It has

adopted the policy of appointing subcommittees, whose expenses are paid by the N. E. A., to prepare careful and exhaustive reports on important questions of contemporary educational interest.

National Guard, kind of militia in France, mostly recruited from the bourgeois class, and representing the burgher interests. In some of the French towns the national guards had long been known, but they were first organized in Paris, 1789, by the revolutionary Committee of Safety. There were 48,000 in Paris, and in 1790 a paper organization of 4,000,000 in France. In 1795 they were defeated and broken up by Napoleon, were reorganized by him, 1814, dissolved by Charles X, 1827, were again reorganized in 1830 and 1831. They fell away from Louis Philippe in 1848, were remodeled, 1851, dissolved and reorganized, 1855, served against the Germans in the War of 1870-71, and in the latter year a part of them took a share in the Communist struggle, after which they ceased to exist. In some other European countries and in some of the U. S. there are militia organizations called national guards. See **ARMY**; **MILITIA**.

National Museum of the United States, an institution located in Washington, D. C., which dates its existence from August 10, 1846, when the Smithsonian Institution was formally established by Congress, and all Government collections assigned to its charge. The germ of the museum was a collection of about 10,000 mineral specimens, being a portion of Smithsonian's bequest to the U. S. This collection was lost by fire in 1865. At the close of the Centennial Exhibition of 1876 the Smithsonian Institution received the collections to illustrate the animal and mineral resources, the fisheries and the ethnology of the U. S., and soon thereafter the present name was legally sanctioned by Congress in an act providing a building for these objects. The National Museum is thus the museum of the Smithsonian Institution. The museum has been enriched by many Government explorations and surveys, and especially by material gathered by the U. S. Fish Commission, the series of deep-sea fishes and invertebrates being very extensive, and the collection of shells is one of the finest in the world. The arts and occupations of the N. American Indians are well illustrated. The historical collections include personal relics of Washington, Jefferson, and Grant.

Nat'ivism, in philosophy, the doctrine that the mind has certain kinds of knowledge, or principles of organization of its experience, native to itself or inborn. It is opposed to empiricism, which holds that knowledge is derived exclusively from experience. Other terms for nativism are apriorism and institutionalism.

Natu'na Is'lands, group of islands in the China Sea, between Borneo and Malacca, belonging to the Dutch; area, 664 sq. m.; are high and mountainous, and produce rice, maize, sago, and cocoanuts.

Nat'ural, term used in music. The regular notes of the scale when unaffected by sharps

or flats (as in the key of C major) are said to be natural, or in their original and ordinary condition; and when any note has been modified by the use of a \sharp or \flat (whether placed at the clef or occurring as an accidental), such alteration may be revoked by prefixing to the note the sign \natural . This sign is called a *natural*, because it restores to the altered note its original character. The natural is also of service in cases where a change of key takes place, where such sharps or flats in the signature as are no longer needed are revoked by the substitution of as many naturals. Double sharps and double flats are restored to simple sharps and flats by the signs $\sharp\sharp$ and $\flat\flat$. See **FLAT**; **SHARP**.

Natural Bridge, arch of great size and beauty, carved or eroded in the horizontal strata of Cambro-Silurian magnesian limestone (Knox dolomite) in Rockbridge Co., Va. The bridge is a small remnant of the roof of a former cavern, now for the greater part opened into a gorge, through which Cedar Creek flows to James River. The gorge widens, and is clothed with trees above and below the bridge; under the arch the walls are bare and vertical, about 50 ft. apart. The arch has a thickness of 44 ft. and a span of from 45 to 60 ft. The crown of the arch is almost 200 ft. above the creek, while the top of the bridge is 236 ft. above the water. A public road leads across the bridge.

Natural Gas, form of bitumen that under natural conditions exists as a gas produced by the decay of organic matters buried in the strata from which it is tapped. Before its true relations had been discovered, it was familiar to the inhabitants of certain localities as escaping from springs and crevices in rocks, producing the phenomena of burning springs and fire wells. Natural gas is particularly abundant in those regions that furnish petroleum and other forms of bitumen, but it is also found in regions where metamorphic or volcanic action has not disturbed the crust of the earth. In the U. S. the extreme E. point that has furnished it is Dutchess Co., N. Y., on the Hudson River. It has been reported from nearly every county in New York State except the Adirondack region, but it is in the region tributary to the city of Buffalo that large and remunerative quantities have been obtained. Throughout the entire oil region of W. Pennsylvania, and extending into Armstrong and Westmoreland cos. to the E., enormous quantities have been supplied, particularly to the city of Pittsburgh. W. Virginia and E. Kentucky have long furnished it, while nearly the whole State of Ohio, N. and central Indiana, and central Illinois have been prolific fields. Outside this territory, lying in the N., Mississippi basin, there is scarcely a section of country to the W. and S. of large extent that has not yielded it. On the Pacific slope it occurs throughout nearly the entire State of California. Outside the U. S. the peninsula of Ontario, Canada, has yielded it in quantities locally valuable.

The earliest attempt to utilize the gas was made at Fredonia, N. Y. The gas was first used, 1824, from wells dug into the rock strata

that underlaid the town, but later wells were drilled. The industry in the Ohio valley dates from 1838, when a well dug in Findlay, Ohio, was found to yield sulphurous water and inflammable gas. Systematic drilling began in this region, 1884, and was soon taken up elsewhere, and from many centers gas was conveyed in pipes to cities and towns more than 100 m. distant. Since 1902 the Indiana fields have steadily declined, but the opening of new wells in Pennsylvania has resulted in increased population, while Kansas, Oklahoma, and Indian Territory have become prolific. In 1905 Louisiana appeared for the first time as a gas-producing state. The value of natural gas consumed in the U. S., 1905, was \$41,562,855; estimated value of fuel displaced by it, \$49,690,918. Value of gas consumed in 1910, \$70,756,158; general average price to the consumers, very close to fourteen cents per 1,000 cu. ft., at a pressure of 4 oz. above the atmosphere. The constituents of average Pennsylvania, W. Virginia, Ohio, and Indiana gas are: Marsh gas, other hydrocarbons, nitrogen, carbonic acid, carbonic oxide, hydrogen, and oxygen; Ohio and Indiana gas also contains hydrogen sulphide; average Kansas gas is composed of marsh gas, other hydrocarbons, nitrogen, carbonic acid, and carbonic oxide. Marsh gas is the principal constituent in all; in Pennsylvania and most of W. Virginia gas, 80.85 per cent; Ohio and Indiana, 93.60; Kansas, 93.65. The average heating quality per 1,000 cu. ft. of Pennsylvania and W. Virginia gas is 1,145,000, against coal gas, 755,000; water gas, 350,000; gas from bituminous coal, 155,000. See GAS.

Natural History, strictly speaking, the history of universal nature or of all natural objects, their qualities and forces, their laws of existence, their origin, and their relations to each other and to man. The study of the physical forces of nature has been separated into distinct branches of science, under the names of natural philosophy, chemistry, astronomy, etc.; leaving for natural history proper the investigation of the minerals and of the various kinds of living things, both animal and vegetable.

Naturalization, act of investing an alien with the rights and privileges of a native-born citizen or subject. It is of two kinds, collective and personal. A collective naturalization takes place when a country or state is incorporated in another country by gift, cession, or conquest. Personal naturalization is where the privileges of a subject or citizen are conferred on an individual by the license or letters patent of a sovereign or the act of a legislative body, or are obtained under a general law, on the compliance of the individual with prescribed conditions. The naturalization laws of the U. S. provide that to become naturalized the alien must declare on oath before a Circuit or District Court of the U. S., or a District or Supreme Court of the Territories, or a court of record of any of the states having common-law jurisdiction and a seal and a clerk, two years at least prior to his admission, that it is bona fide his intention to become a citizen of

the U. S., and to renounce forever all allegiance and fidelity to any foreign prince, state, or sovereignty of which the alien may be at the time a citizen or subject. His full admission to citizenship cannot, however, take place until he has resided within the U. S. for the continued term of five years next preceding his admission, and one year at least within the state or territory where the court is held to which he makes application. In Great Britain no general naturalization law was enacted until the year 1844. Before that time naturalization could be effected only by special act of Parliament. A comprehensive statute in regard to the naturalization of aliens was enacted in 1870 (33 Vict., ch. 14), and this with slight changes or additions is the law at present in force. By this it is provided that an alien who has resided in the United Kingdom, or has been in the service of the crown, for a term of not less than five years, and intends, when naturalized, to continue either his residence or his service, may apply to one of her Majesty's principal secretaries of state for a certificate of naturalization. In France after ten years residence a foreigner may be at once naturalized without preliminary ceremony; or, after he has obtained permission to become domiciled in France, he is entitled to letters of declaration of naturalization after three years' residence. In Germany a foreigner must show that he is at liberty, under the laws of his own country, to change his nationality, that he is living in Germany and has means of livelihood. See ALIEN; CITIZEN.

Natural Law, law which arises or exists not by agreement of men, but in the nature of things; that is, the law which is prescribed to all men and beings by the Creator of the universe, and by which all creatures are governed. This law is discovered or discerned by the dictates of right reason, and is opposed to those laws which are mere rules of conduct prescribed by the civil power of the state or by agreement between nations, the latter being called the positive law.

Natural Philosophy, that branch of physical science which deals with properties of bodies that are unaccompanied by essential changes of the bodies themselves. See PHYSICS.

Natural Selection. See EVOLUTION.

Natural Theology, science treating of the existence and character of God as these may be known from reason and nature. It investigates the evidences of His being and seeks to determine His attributes and relations to the world. The conclusions thus reached and scientifically established form what is termed rational theism, or the doctrine of God as ascertainable apart from supernatural revelation. The primary idea on which it proceeds is that, if there be a God as the Creator or First Cause of the universe, His existence and character must be found impressed on it and discoverable from it. One of the primary conceptions of science is that nature holds and presents in its constitution and order some record of its origin, legible to the reason of those who study it.

Natural theology seeks to examine this record, take its testimony, and thus, if possible, ascend through nature up to nature's God. See PHILOSOPHY; THEOLOGY.

Nature Study, branch or department of the American educational system; recently introduced as a part of regular school work, and received with general favor. Its object is to interest the child in the world about him, by making him more familiar with the things he oftenest meets. Moving things, as birds, insects, and animals, interest children most, and are therefore most proper for nature study, but they are also the most difficult to obtain. The most practical materials for the purpose are plants. Where a teacher can take a class of children into a patch of woods and explain the various growths there seen, the time spent will be a physical and mental advantage of much value. Where this and other short sight-seeing trips are not practicable, the prime object of nature study may be pleasantly promoted by an exposition and explanation of suitable objects in the classroom. Cornell Univ. was the first notable institution to organize a system for nature study in the schools, and has done much by publishing hints and aids to promote the work.

Naucratis, or **Naukratis** (nā'krā-tis), garrison city established by Psammetichus I, abt. 665 B.C., for his Ionian and Carian mercenaries; was located at what is now called Tell Nebireh, on a canal W. of the Rosetta branch of the Nile, near Sais, the capital of the twenty-sixth dynasty, and close to the Libyan frontier. Its site was discovered by W. M. Flinders Petrie, 1883, and explored by him, 1885-86. Its origin was entirely Greek. Naucratis contained a number of large buildings—a temple to Hera, another to Aphrodite, a small one to the Dioscuri, the Panhellenion, the largest of all and the Greek religious center of Egypt, and, oldest of all, a temple to the Milesian Apollo, in the center of the town. The discovery of Naucratis was important in its results, since it threw light on the earliest intercourse between Egypt and Greece, and also on the history of the Greek alphabet, the Naucratic specimens of Greek caligraphy being among the oldest known.

Naumburg (nowm'börkh), fortified town of Prussian Saxony; on the Saale, 23 m. SSW. of Halle. The restoration of the cathedral, one of the finest specimens of German mediæval architecture, was begun, 1874. An annual children's festival is celebrated here, in commemoration of the raising of the siege by the Hussites under Procopius, said to have taken place, July 28, 1432, in consequence of the entreaties of the children of Naumburg. It has active manufactures and commerce. Pop. (1900) 23,187.

Nauplia (nā'pli-ä), town of Greece; on the Gulf of Argolis; 58 m. SW. of Athens. Its three forts make it the strongest maritime town of Greece. In 1824-34 it was the seat of the government. In antiquity it was the

port of Argos; now called the Gibraltar of Greece.

Nausea (nā'shē-ä), sensation at the pit of the stomach which usually precedes vomiting. It may be produced by certain drugs, the continued rotation or swinging of the body, the unaccustomed motion of a vessel on the waves, improper food, a blow on the head, and in sensitive persons offensive odors, sudden alternations of temperature, and even moral impressions. If the sensation be excited by any substance which has been taken into the stomach, the best treatment is to favor the act of vomiting by copious draughts of warm water. If it depends on any other of the causes named, quiet, a horizontal position, and freedom from all sources of disturbance are most effectual. See VOMITING.

Nautch (näch) Girls. See BATADERE.

Nautical Almanac. See EPHEMERIS.

Nautil'idae, only existing family of the once numerous group of Tetrabranchiate Cephalopods. The animal differs from that of other Cephalopods (squids and cuttlefish) by having numerous tentacles, an eye formed on the type of the pinhole camera (i.e., without a lens), four gills, and a chambered shell. This shell is well known. It is coiled in a flat spiral, and



SECTION OF A NAUTILUS, SHOWING ITS INTERIOR.

the interior is divided by partitions into numerous chambers, which are connected with one another by a tubular structure, the siphuncle. The animal occupies the large outer chamber. The only existing genus is *Nautilus*, and of the habits of this almost nothing is known, for while the shells—familiar as the “pearly nautilus”—are common, the animals are among the greatest rarities. These animals feed on small crabs. Fossil forms belonging to this family are numerous, over 2,000 species being described; only six living species are known.

Navajos (nā'vā-hōz), members of a tribe of N. American Indians, belonging to the Apache

family and the Athabaskan stock, occupying a large reservation in Arizona; formerly almost constantly at war with the Mexicans, and, till 1863, with American whites; now well advanced in civilization and largely engaged in agriculture and raising live stock; numbered (1900) abt. 20,000.

Na'val Acad'emy, U. S. See UNITED STATES NAVAL ACADEMY.

Naval Observatory of the United States, an institution under the Navy Department of the U. S. located at Georgetown, D. C. It was established in 1842 as the depot for naval charts and instruments. The "Nautical Almanac" is here compiled. The elaborate equipment of the observatory includes a 26-in. equatorial telescope which, when installed in 1874, was the largest of its kind in the world.

Naval Signals. See SIGNALING; SIGNAL SERVICE.

Navarino (nā-vā-rē'nō), fortified town of the Morea, Greece, at the S. extremity of a bay of the same name, 3 m. from Old Navarino. The bay, about 3 m. long and 2 m. wide, is shut in by the island of Sphacteria, or Sphagia, where the Athenian Cleon defeated the Spartans, 425 B.C. Here, on October 20, 1827, the combined British, French, and Russian fleets destroyed the Turkish-Egyptian fleet. Pop. abt. 2,000.

Navarre (nā-vār'), province of Spain, between the Pyrenees and the Ebro; area, 4,055 sq. m.; pop. (1900) 307,669; capital, Pamplona. The old kingdom of Navarre (which originally included also what is now the French department of Basses-Pyrénées) successfully resisted the invasions of the Saracens, and remained independent until Ferdinand and Isabella conquered it, 1512, and annexed it to Aragon; it preserved many peculiar privileges, however, which were not finally abolished until 1876.

Nave (nāv), in architecture, a term used to designate in general the principal hall of a church as distinguished from the choir, transepts, chapels, or side aisles. It is also sometimes applied in secular architecture to large and imposing halls of more than usual length and loftiness, which resemble in form and proportion the nave of a church. The typical arrangement of the nave and side aisles in Christian architecture was derived from the Roman secular basilicas. These were halls with nave, side aisles, a species of transept, and an apse or tribune. The naves, separated from the aisles by arcades or colonnades, were lighted by clerestory windows and covered with wooden roofs, sometimes with open trusses, sometimes with richly paneled or coffered ceilings. In a cruciform church the nave extends from the front to the transepts, and is commonly flanked by single or double side aisles on either hand.

Navigation, art of conducting a ship from port to port and across the ocean with safety and dispatch, and, more particularly, of deter-

mining her geographical position from time to time by observations of the heavenly bodies. Before going to sea, the ship should be furnished with charts of the ocean to be traversed; a sextant or octant; a compass fitted with attachments for observing azimuths; a nautical almanac for the current year; a chronometer running on mean time whose error for a given meridian (generally that of Greenwich, England) and daily rate of error are known; a standard work on practical navigation; a lead line marked for taking soundings; and a log line for measuring the ship's speed. When the cargo is stowed and the vessel otherwise ready for sea the local deviation of her compass should be determined. As the ship stands out to sea a *departure* is taken; i.e., the ship's latitude and longitude are found from the chart by the bearing and distance of one landmark, or from the bearing of two or more marks whose positions are laid down on it. As soon as this departure is taken the *course* is shaped for the port to which the ship is bound, due regard being had for the winds, currents, and dangers to navigation to be encountered by the way, and from this time on the course steered, the speed of the ship, etc., are duly noted in the log book.

Suppose the ship sails at night. At or about 8 A.M., or, better still, when the sun bears most nearly true E., and yet has risen high enough to avoid the irregular refraction near the horizon, its *altitude* (angular distance above the sea horizon) is measured with the sextant, and the instant of observation is noted by the chronometer. With the latitude and longitude of the ship at the time of taking the departure, with the courses and distances sailed, the former corrected for variation, leeway, and deviation to the time of the observation, the latitude and longitude, or position by *dead reckoning*, is computed by trigonometry. From the altitude of the sun observed (corrected, as all altitudes of the sun taken at sea have to be, for semidiameter, parallax, dip, refraction, and the index error of the sextant), we have the true altitude of the sun's center as seen from the center of the earth; from *The Nautical Almanac* the sun's declination for the instant of the observation is obtained; and by the dead reckoning the approximate latitude. These data give the three sides of the astronomical triangle; and from this is computed one of its angles, the hour angle of the sun, the local apparent time, which is converted into mean time by the application of the equation of time taken from the almanac; the difference between the local mean and the chronometer time gives the longitude by observation.

Near noon the observer again begins to observe the sun, and continues to do so as long as the altitude increases, noting the sextant reading at the greatest altitude attained. The sun is said to *dip* when the altitude begins to decrease. The greatest altitude is assumed to be that when on the meridian, which is correct within small limits. By combining the sun's meridian altitude with its declination, the declination of the zenith which is the

latitude of the position, is obtained. The ship's run worked from the place of departure gives the *latitude and longitude by dead reckoning*; from the longitude by the A.M. observation corrected for the ship's run to noon the *longitude by observation*, and from the meridian altitude the *latitude by observation* is obtained. Any difference between the ship's position by observation and dead reckoning is ascribed to *current*, and its set and amount are, respectively, the bearing and distance of the position by observation from that by dead reckoning.

The sun, however, may be obscured by clouds at the time of its crossing and meridian, and then it is necessary to use some other method than the one given for finding the latitude. Appropriate formulas have been deduced for this by considering in the astronomical triangle the coaltitude and codeclination (the respective differences between a right angle and the altitude and declination angles), and the hour angle. This last, at sea, is always somewhat in doubt, but small errors in the hour angle, when the angle itself is small, produce but slight errors in the latitude; under most circumstances good latitude results can be obtained from observations taken within one hour of the sun's transit over the meridian. Observations of other heavenly bodies may be used for determining the latitude, longitude, and error of the compass. They are less resorted to, however, because of the difficulty of seeing clearly the horizon at night, this obscurity throwing some doubt upon the accuracy of all altitudes measured after dark. The winds and currents of the ocean have a material influence upon the speed of ocean voyages, even with modern steamers. With sailing vessels they are most important, and are truly said to control the mariner in his course; to know how to steer a ship so as always to make the most of them is the perfection of navigation. The approaches to the ports and the appearance of the land in their vicinity are described in local *Sailing Directions*, which are very complete for all parts of the globe, and are the guides for entering port and anchoring.

Navigation Laws, enactments by which commercial states endeavor to regulate navigation so as to promote their own commerce. Such laws have existed among all the maritime states of Europe for many centuries. The navigation laws of England, so called, date from Cromwell's time. They provided that no ship should be deemed British unless wholly built in British dominions, wholly owned by British subjects, and navigated by a British commander and a crew of which at least three fourths were British subjects; that only British ships should carry any merchandise from one port to another, where both were in the British Empire; and that no goods which were the growth, product, or manufacture of Asia, Africa, or America should be imported into Great Britain except in British ships or in ships of the countries of which the goods were the production. These laws are supposed to have done much to give Great Britain her enormous commerce. Since 1849 the principle of free

trade has caused them to be considerably modified. In the U. S., Congress enacted navigation laws, 1792-93, which are substantially the same as the English acts then in force, or, where they differ, more rigorous. These statutes have not been materially altered. See also **INTERNATIONAL LAW**.

Navigator's Islands. See **SAMOA**.

Na'vy, a fleet or assemblage of ships or vessels; specifically, the whole of the war vessels of a nation; the war marine of a state. Navies have grown out of either military necessities or the requirements of an ocean commerce obstructed by pirates. Trade and navigation may be said to be the parents of navies, those countries most largely interested in the former generally boasting of the most powerful fleets. While foreign trade produces wealth, and at the same time trains a class of men to the hardships of the sea, it requires protection and assistance in return. This is rendered by the military marine, whose service is largely recruited from the commercial. A navy proportioned to the commercial tonnage of a country and the extent of its shore line is the best and least expensive protection to the coasts and commerce of that country. Since an efficient naval force (unlike an army) cannot be improvised, every maritime state has found it necessary to maintain a permanent navy; and such navies have seldom lent themselves to the subversion of the political organization of the state. Besides the ordinary duties of policing the seas to keep down piracy and of affording a moral support to ministers at foreign courts and merchants in foreign trade, navies are constantly engaged in the fields of science, and have contributed generously to the common stock of knowledge and the advancement in civilization.

The Constitution of the U. S. imposes on Congress the duty of providing and maintaining a navy, and of making rules for the government and regulation of the naval forces. It declares the President to be commander in chief of the army and navy, and requires him to commission all officers of the U. S. The Secretary of the Navy presides over the Navy Department, and is the duly constituted adviser of the President on all questions relating to naval affairs. In his former duties he is assisted by an Assistant Secretary and the chiefs of eight bureaus, as follows: Equipment, Yards and Docks, Navigation, Ordnance, Medicine and Surgery, Supplies and Accounts, Steam Engineering, and Construction and Repairs.

Vessels are named by the Secretary of the Navy, under direction of the President, as follows: First rates, after the states of the Union; second rates, after cities; third rates, after important events or names connected with the naval history of the U. S.; fourth rates, after lakes and rivers of U. S. Modern warships include the following types: Armored vessels for the line of battle and for coast service, armored cruisers, rams, protected cruisers, unarmored cruisers and auxiliaries, gun vessels, gunboats, torpedo vessels, torpedo catchers, torpedo boats, and various vessels for harbor service. The following table gives a

comparison of the sea strength of the principal naval powers, December 1, 1911:

olives in abundance and of superior quality. Naxos, on the NW. coast, is the capital. There

NATION.	Battle-ships Dreadnought type.a	Battle ships.b	Armored cruisers, Invincible type.c	Armored cruisers.	Cruisers.d	Destroyers.	Torpedo boats.	Sub- marines.	Coast defense vessels.e
England.....	22	70	10	44	89	223	59	82	0
Germany.....	9	36	5	14	45	121	22	24	5
United States...	12	37	0	12	30	60	28	38	4
France.....	0	27	0	21	10	85	200	81	2
Japan.....	0	16	1	14	18	60	59	13	2
Russia.....	0	14	0	6	11	108	29	39	2
Italy.....	0	15	0	10	9	32	74	20	0
Austria.....	0	10	0	3	9	20	55	12	6

a Battle ships having a main battery of all big guns (11 in. or more in caliber).

b Battle ships are those of (about) 10,000 tons or more displacement.

c Armored cruisers having guns of largest caliber in main battery and capable of taking their place in line of battle with the battle ships. They have an increase of speed at the expense of carrying fewer guns in main battery, and a decrease in armor protection.

d Includes all unarmored cruising vessels above 1,000 tons displacement.

e Includes smaller battle ships and monitors. No more vessels of this class are being proposed or built by the great powers.

A comparison of the naval expenditures of the principal naval powers for the year 1912 is given in the following table:

England.....	\$216,086,101
France.....	80,371,109
Germany.....	107,232,000
Japan.....	42,944,329
Italy.....	46,476,552
Russia.....	88,633,046
United States.....	126,404,509

In effective force the U. S. navy was in 1886 rated as nineteenth among the nations. Thus the U. S. followed Japan, Turkey, Greece, Brazil, Chile, and Portugal. In 1895, counting as effective the vessels built and building, the U. S. took rank as fifth, in this order: Great Britain, France, Russia, Italy, U. S. On December 1, 1911, the relative order of warship tonnage of the largest of the world's navies was as follows:

NATION.	Tonnage.
Great Britain.....	2,324,579
Germany.....	1,087,399
United States.....	885,066
France.....	741,425
Japan.....	590,119
Russia.....	473,879
Italy.....	312,122
Austria.....	267,442

Among the notable scientific undertakings of the navy of the U. S. may be mentioned the U. S. Exploring Expedition and that to Japan, the interoceanic canal surveys, Arctic voyages, and those for deep-sea soundings, the Pacific explorations for hidden dangers, and the distant voyage of the *Sveatara* (which, like that of Capt. Cook to Otaheite in 1769, was undertaken for the purpose of observing the transit of Venus). Besides these the cruise of the Atlantic squadron around the world, 1907-9, is notable.

Navy Yard. See DOCKS AND DOCKYARDS.

Naxos, island of Greece; largest and most fertile of the Cyclades; 20 m. long and 14 m. broad. It is high and mountainous, but contains many beautiful, well-watered, and fertile valleys, which produce wheat, wine, figs, and

was a Duchy of Naxos, which lasted (from 1206 A.D.) 360 years, giving place to the Turkish dominion, 1566. Pop. abt. 16,000.

Nazareans. See MANDAEANS.

Nazarene (nāz-ā-rēn'), term employed in several significations in the New Testament and in ecclesiastical history. As first used (Matt. ii, 23) it is applied to Christ's residence at Nazareth as the fulfillment of a prophecy that "he shall be called a Nazarene"; but as no such passage occurs textually in the Old Testament, the term has been referred to the Nazarites, or to *Netser*, "the Branch" (Isa. xi, 1); or rather, it expresses reproach, Nazareth being a proverbially contemptible place (John i, 46).

Nazareth, village of Palestine; in the ancient district of Galilee; 70 m. N. of Jerusalem; celebrated as the place of the Annunciation and the abode of Christ during most of his life. The Roman Catholics have erected a church on the spot where the angel came to Mary to announce the birth of the Saviour, and the Greeks a church on another spot where the event took place, according to their belief. Chapels have also been built over Joseph's workshop and over Christ's table where he used to eat with his disciples. The village is in a little valley about a mile long and a quarter of a mile wide, just N. of the Plain of Esdraelon. Pop. abt. 11,000.

Nazareth, borough in Northampton Co., Pa.; 7 m. NW. of Easton; established 1740 by George Whitefield as the site for a school for negroes; abandoned by him and purchased by Count Zinzendorf, who established a settlement for Moravians, 1743; contains the Whitefield House, erected 1740, now belonging to the Moravian Historical Society, and having a valuable library and collection of Moravian antiquities; Nazareth Hall, the Moravian military boarding school for boys, founded 1785; board of trade, organized 1877; fair grounds of the Northampton County Agricultural Society; manufactories of seamless underwear and hosiery, agricultural implements, paper boxes, and guitars. Pop. (1910) 3,978.

Naz'arite, among the ancient Hebrews, an ascetic of either sex who had taken a vow to

abstain from wine, strong drink, including date and palm wine, and everything that is made of the vine, to let the hair grow, and to touch no dead body. Nazarism is older than the time of Moses (Num. vi, 2). The vow might be either for a specified time or for life. Samson and Samuel were Nazarites for life, and so was John the Baptist.

Neal (nēl), **Daniel**, 1678-1743; English historian; b. London; was an Independent minister there; principal work, "History of the Puritans."

Neander (nā-än'dér), **Johann August Wilhelm**, real name, **DAVID MENDEL**, 1789-1850; German church historian; b. Göttingen of Jewish parents; under the influence of Schleiermacher's "Discourses on Religion," became, 1806, a convert to Christianity; began, 1811, to lecture in Heidelberg, and, 1812, became Prof. of Church History at Berlin. His reputation mainly rests on the "General History of the Christian Religion and Church," from the close of the apostolic age to the Council of Basel in 1431. His numerous other works comprise a "History of the Apostolic Age," and a "Life of Jesus Christ," in refutation of Strauss.

Nearchus (nē-är'kūs), one of the generals of Alexander the Great; commanded the fleet during the Indian expedition, and conducted it at the end of the campaign from the mouth of the Indus, through the Persian Gulf, to the mouth of the Tigris. Of his voyage he wrote an account, *Παρταλίου*, of which the substance is in Arrian's "Indica."

Ne'bo, one of the principal divinities of the Babylonian pantheon, generally identified with the Egyptian Thoth and the Greek Hermes. His greatest temple was at Borsippa (Birs-Nimrud).

Nebo, mountain of E. Palestine, "over against Jericho" (Deut. xxxii, 49), identified, 1875, by Prof. John A. Paine, of the American Palestine Exploration Society, with Jebel Nebba, 5 m. SW. of Heshbon. It is 2,685 ft. high. There was also a city of the same name (Num. xxxii, 3) in the immediate neighborhood.

Nebras'ka (from Indian, literally "shallow water," or "water valley"), popular name, **BLACKWATER STATE**; state flower, golden rod; state in the N. central division of the American union; bounded N. by S. Dakota; E. by Iowa and Missouri, from which it is separated by the Missouri River; S. by Kansas and Colorado; W. by Colorado and Wyoming; extreme length E. to W. 420 m.; N. to S. 208 m.; area, 77,520 sq. m.; pop. (1910 census) 1,192,214; principal cities and towns, Omaha, Lincoln, (capital), S. Omaha, Beatrice, Grand Island, Nebraska City, Fremont, Hastings, Kearney.

The surface is gently rolling in the E., but along the W. boundary exceeding 4,000 ft.; highest point in state, Scott's Bluff, a little to the S. of the point where the N. fork of the Platte enters the state; principal rivers, besides the Missouri, the Platte, formed by two branches, and running the entire length of the state, the Niobrara, in the extreme N., an afflu-

ent of the Missouri, and the Republican, a tributary of the Kansas, draining the S. and SW. The mean annual temperature is 46.80-51.40; highest temperature and greatest rainfall (30 in.) in SE.; rainfall in the W. often less than 15 in., rendering irrigation necessary. The chief mineral products are limestone, sandstone, gypsum, lignite coal, potter's and other clays, and salt, obtained by evaporation; total value products (1910) \$1,552,794.

Soil unusually rich, covering the state to a depth of about 200 ft.; subsoils equally rich, and fertilization almost unnecessary any-



where; failure of crops due solely to lack of water, especially in the W., where droughts occur. Production of principal crops (1911): Corn, 155,925,000 bu.; wheat, 41,574,000 bu.; oats, 34,750,000 bu.; barley, rye, and buckwheat also important crops; flaxseed, potatoes, and hay; value of live stock (1911), \$218,241,000. The sugar beet is cultivated extensively, orchard fruits are raised in large quantities, and dairying is an important industry. Most important manufacturing industries: Smelting at Omaha; pork packing at Omaha, Lincoln, and Nebraska City; distilling and brewing at Omaha and Nebraska City; limestone quarrying and the manufacture of beet sugar at Norfolk and Grand Island; linseed oil at Omaha; cotton goods at Kearney; flour and starch at Nebraska City; railroad cars at Omaha and near Lincoln, and farming implements in several places; "factory-system" plants (1909), 2,500; capital employed, \$99,901,000.

Principal educational institutions: Belleville College (Presbyterian); Cotner Univ. (Christian), Bethany; Union College (Seventh-day Adventists), College View; Doane College (Congregationalist), Crete; Grand Island College (Baptist); Hastings College (Presbyterian); University of Nebraska (state), Lincoln; Creighton Univ. (Roman Catholic), Omaha; Nebraska Wesleyan Univ. (Methodist Episcopal), University Place; York College (Union Baptist), York; industrial schools for Indian youth at Genoa, Omaha Agency, and Santee; eleven training schools for nurses; industrial and reform schools at Geneva, Kearney, and Milford; State Institution for the Deaf and Dumb at Omaha; Nebraska Institute for the Blind at Nebraska City.

The S. part of the state was visited by Coronado as early as 1541, and by Father Marquette, who mapped out the Platte and Missouri, 1673. The fur-trading periods, in the latter part of which the Nebraska country served as trading ground, may be divided as follows: French, 1634-1763; British, 1763-1816; American, 1816-34. From 1803 to 1854 the tract was nothing in fact but Indian country, known on the statute books as Louisiana Territory, 1805, or the Territory of Missouri, 1812. In 1810 the American Fur company located a trading post at Bellevue, on the high bluffs just N. of the mouth of the Platte River. The U. S. Govt. established Fort Atkinson, afterwards called Fort Calhoun, 1820. It was abandoned, 1828. The Mormons removed from Illinois, 1846, and had "winter quarters" a few miles N. of Omaha. Nearly all of them shortly made their way beyond the mountains to Salt Lake City. The next great movement of population to the West, that of the gold hunters, beginning, 1849, gave to the W. bank of the Missouri its first towns, and Nebraska City and Plattsmouth had become towns of some size when the lands were formally thrown open to settlers. The first organization of the country by the famous Kansas-Nebraska Bill, 1854, made one territory of all the region between parallel 40°, the summit of the Rocky Mountains, the Canada line, and the Missouri River. Under the territorial form of government, 1854-67, the capital was at Omaha. With statehood, 1867, came also the Union Pacific Railway, and a change of the capital to Lincoln.

Nebraska, University of, nonsectarian, co-educational institute in Lincoln, Neb., founded, 1869, by act of the legislature; had (1910) over 260 professors and instructors, over 3,000 students in all departments; has 90,000 volumes in its libraries, a museum, grounds and buildings valued (1910) at \$1,500,000, scientific apparatus at \$263,800, productive funds aggregating \$672,272, and an average income of \$805,403. The university comprises the Graduate School, the College of Arts and Sciences, the Teachers' College, Colleges of Agriculture, Engineering, Law, and Medicine; Schools of Pharmacy, Fine Arts, Music, and Agriculture (a secondary school), and the Summer Session. Most of the work of the agricultural department is done on the university farm of 320 acres, situated 2½ m. NE. of the city campus. The last two years' work of the Medical College is given in the Medical College building at Omaha.

Nebuchadnezzar, greatest of the kings of Babylon, son and successor of Nabopolassar, founder of the empire; was of marriageable age at the time of his father's revolt against Assyria (625 B.C.), at which time Amuhia, daughter of the Median king, was betrothed to him; is supposed to have commanded the Babylonian auxiliaries in Cyaxares's war against Lydia, and to have brought the hostilities to a close by his mediation on the occasion of the famous eclipse foretold by Thales, 610 B.C. He regained Carchemish on the Euphrates from the Egyptian king, 605; subjugated Syria and

Palestine, carrying the principal Jews into captivity in the same year; succeeded to the throne, 604; besieged Tyre, 598; completed the reduction of Judea, 586; destroyed Tyre after a siege of thirteen years, 586; invaded and ravaged Egypt some years later; rebuilt in a splendid manner all the cities of upper Babylonia; constructed vast temples, aqueducts, and palaces, the ruins of which still testify to their grandeur. Of his insanity and the events preceding it we have no other account than from the Book of Daniel.

Neb'ula, class of stellar matter having the appearance, through an ordinary telescope, of a small, cloudlike patch of light. An enlargement of telescopic power usually converts this appearance into a cluster of innumerable stars, besides bringing to light other nebulae before invisible. These in turn yield to augmented magnifying power; and thus every increase in the capacity of the telescope adds to the number of clusters resolved from nebulae, and of nebulae invisible to lower powers. Nebulae proper, or those which have not been definitely resolved, are found in nearly every quarter of the firmament, though abounding especially near those regions which have fewest stars. Scarcely any are found near the Milky Way, and the great mass of them lie in the two opposite spaces farthest removed from this circle. Their forms are various, and often undergo strange changes as the power of the telescope with which they are viewed is increased, so as not to be recognizable in some cases as the same objects. The spiral nebulae are an example of this transformation. They have the appearance of a maelstrom of stellar matter, and are among the most interesting objects in the heavens. There is another class of nebulae which bear a close resemblance to planetary disks, and are hence called planetary nebulae. They are very rare. Some of them present remarkable peculiarities of color.

In telescopes of the highest power some of the so-called planetary nebulae assume a totally different appearance; and many of them are singularly complicated in structure, instead of being simple globes of nebulous matter, as was formerly supposed. There are several which have perfectly the appearance of a ring, and are called annular nebulae. The number of these wonderful objects which have been recognized in all the heavens is upward of 5,000. The application of spectroscopic analysis to these objects has resulted in the discovery that while some nebulae are really clusters of stars, other consist in the main of gaseous matter. The former give spectra resembling the spectra of stars; the latter give a spectrum of three bright lines (occasionally four), one line corresponding in position to a line in the spectrum of hydrogen, another corresponding to a line in the spectrum of nitrogen.

Neb'ular Hypoth'esis, a theory of the formation of stars and planets. The idea that the earth was, in some way, formed or created by the collection and arrangement of matter originally in a chaotic state seems to have been a part of the heritage of our race, being familiar even in prehistoric times. The first verse

of the Book of Genesis may be cited as an indication of this; but it was impossible to form any scientific basis for such a theory until after the discovery of universal gravitation. Swedenborg may be regarded as first to suggest the modern theory. The accord of his work with recent ideas, however, was more in his description of the succession of the phenomena than in his reference to the theory of gravitation. Kant is generally regarded as the actual founder of the nebular hypothesis, because he reached it both inductively, by a study of the structure of the solar system, and deductively, by showing how gravitation could have resulted in the formation of the system from nebulous matter. He was the first to show that the hypothesis explains the fact that the orbits of the planets and satellites are all very nearly in the same plane, and that the revolutions both around the sun and on their axes are all in the same direction. We now know that this is not true of the satellites of Uranus and Neptune, but Kant was not acquainted with those bodies.

Herschel reached the same conclusions as Kant, but in an entirely different way, viz., by his telescopic examination of the nebulae. He found that no sharp line could be drawn between the nebulae properly so called, which seemed to be composed wholly of glowing vapor, and clusters of stars. These two classes of bodies seemed to shade into each other by insensible gradations. He therefore conceived that the stars are formed by the condensation of nebulae. In later days the most eminent writer on the subject is Herbert Spencer, who has made the hypothesis a part of his general theory of evolution, and shows how the process by which nebulous matter condensed into planets was analogous to that which is seen in the generation and growth of animals, and in the whole tendency of progressive natural changes.

Necho (nē'kō), in the Bible called PHARAOH NECHO and in the hieroglyphics NEKU, King of Egypt; belonged, according to Herodotus, to the twenty-sixth dynasty; a son and successor of Psammetichus I, and reigned, according to Rawlinson, 610-594 B.C. He defeated Josiah, King of Judah at Megiddo, 608 B.C., having landed in Syria with a great armament and penetrated into Babylon, but was afterwards routed by Nebuchadnezzar at Carchemish, 605 B.C., and lost all his conquests. A canal connecting the Nile with the Arabian Gulf was commenced by him, and by his aid the Phoenicians undertook a circumnavigation of Africa.

Neck'ar, river of Germany; rising in the Schwarzwald Mountains, on the frontier of Württemberg and Baden; flows with a tortuous course of 210 m. through a beautiful tract of land between low, vineclad hills, and joins the Rhine at Mannheim; receives from the left the Enz and from the right the Jaxt, but it is shallow and difficult of navigation.

Necker', Jacques, 1732-1804; French statesman; b. Geneva, Switzerland; went to Paris, 1747, as a clerk in a banking house; established afterwards a business of his own, and acquired a large fortune; married, 1764, Su-

sanne Curchod, who established a famous salon; retired from business and became syndic or director in the French East India Company; subsequently was the diplomatic representative of Geneva in Paris. A eulogy on Colbert, and an essay on the Corn Laws gave him great authority in financial matters. Necker was director of the treasury, 1776-77, and director general of the finances, 1777-81, when, having offended the queen by thwarting her wishes, and having published a report on the financial affairs of France which displeased the court and the prime minister, he was dismissed. He had greatly improved the financial condition in some respects, had made taxation more equitable, and restored public confidence, but his persistent borrowing increased the public debt. From 1781 to 1787 he resided on the estate of Coppet near Geneva, and there wrote "On the Administration of the Finances." He returned to Paris, 1787, but was soon banished for an attack on the financial policy of Calonne. Financial matters having reached a crisis, Necker was recalled, 1788, and made Comptroller General and Minister of State. He was regarded as the savior of France, and when, 1789, the king once more dismissed him because he had declined to participate in a royal measure by which the constitution of the Third Estate as a national assembly was to be annihilated, Paris rose in insurrection, and he soon returned in triumph. Having failed as a statesman, and having lost popularity as a financial authority, he resigned, September 4, 1790, and lived afterwards at Coppet. His daughter, Anne Louise Germaine, became noted as an author.

Necker de Saussure', Adrienne Albertine, 1765-1841; French author; b. Geneva, daughter of a scholar under whom she received a brilliant education; was at one time engaged to the historian Gibbon; married Jacques Necker, nephew of the famous minister of Louis XVI. Increasing deafness forced her to abandon the distinguished society in which she had figured prominently, and henceforth her life was devoted to the education of her children and to study. She published several works, chief of which is "Progressive Education, or Study of the Course of Life," crowned by the French Academy.

Nec'romancy. See MAGIC.

Necro'sis, death of a large piece of bone or of a whole bone in the living subject, as distinguished from *caries*, the ulceration or molecular death of bone. Necrosis may result from injury, phosphorus poisoning, etc. It almost always calls for surgical interference for its complete cure. In all cases a generous diet, with tonics, is called for. The term necrosis is also used to designate a variety of destructive diseases of the soft parts, of which cheesy degeneration or caseation and gangrene are types. See CRIES.

Nectan'ebō I, first king of the thirtieth Egyptian dynasty, reigning 386-368 B.C. In spite of the Persian wars he left his name on many monuments and buildings. The extant evidence points to this as a brilliant season in

Egyptian history. Greek influence was felt in all departments of life, and the warlike operations of the period were carried on largely by the aid of Greek mercenaries.

Nectanebo II, last native king of Egypt; reigned, 361-349 B.C. Ochus, the Persian king, marched to Pelusium and thence to Memphis after having defeated the allied forces of Cyprus, Phœnicia, and Egypt. Seeing the futility of further resistance, Nectanebo II gathered what valuables he could and fled, probably to Ethiopia, some say to Macedon. The Persian rule, which succeeded, gave place, 332 B.C., to that of Alexander the Great.

Nec'tar, in Greek and Roman mythology, the beverage of the gods, described as a red wine, imparting health, vigor, youth, and beauty to all who drank it.

Nectarine (nĕk'tĕr-in), tree and its fruit, differing from the peach, from which it is derived, mainly in having a smooth skin instead of a downy one. The nectarine is much grown in California, and can be grown wherever the peach thrives.

Ned'jed, or **Nejd** (Arabian, "elevated land"), term used by Arabs in connection with other names, as *Nedjed-el-Hedjaz*, or *Nedjed-el-Oman*; also applied by geographers to a portion of N. and central Arabia, at one time a Wahabite kingdom of considerable strength. The Wahabites overpowered the native tribes toward the end of the eighteenth century; erected a kingdom which included Mecca; were in turn overpowered by the Egyptians, 1818; and again secured independence; chief towns, *Riah* (capital), *Oneise*, and *Bereide*; principal occupation of people, breeding camels and a famous class of horses.

Needle, slender steel instrument, pointed at one end and with an eye at the other, used for carrying the thread in sewing. Among uncivilized people, at a very early period, rude attempts were made to form needles or bodkins of bone and ivory, by means of which their garments might be stitched together; but among the more refined nations of antiquity, as the Chinese, Hindus, Egyptians, Assyrians, and Hebrews, fine needles must have been in common use. Pliny mentions needles of bronze for sewing and knitting as being in use in his day, and large bronze needles have been found in Egyptian tombs, which must have been made four thousand years ago. The Spanish or steel needle was introduced into England in the time of Queen Elizabeth; but the process by which it was made was kept secret, and the art was unknown till 1650, when it was revived by Christopher Greening at Long Crennden in Buckinghamshire. Great improvements have since been introduced in needle making; and the "fine steel needles" of that period bear but a faint resemblance to the delicate and highly tempered needles of the present time. The principal kinds are: (1) The sewing needle, used by hand, which is a small piece of steel wire pointed at one end and pierced at the other so as to receive the thread. (2) Needles used by hand in knitting, crocheting,

etc. The former are straight, slender rods with rounded ends, while the latter have a hook at one end. (3) Needles used in knitting machines and sewing machines; they are of a considerable variety of forms.

Needle Gun, form of breech-loading small arms, for a long time the regulation weapon of the German infantry. It is the invention of Nicolaus Dreyse. Its efficiency was demonstrated in the War of 1866 between Prussia and Austria. The cartridge is exploded by means of a needle thrust into the detonating mass along the bore of the piece.

Needles, The, cluster of five pyramidal rocks in the English Channel, off the W. extremity of the Isle of Wight. In 1764 the principal one, 120 ft. high, fell and almost entirely disappeared, and only three now rise to any considerable height above the water.

Neesima (nĕ'si-mă), Joseph Hardy, 1843-90; Japanese educator; b. Tokyo; was educated at Andover and Amherst under the patronage of the man whose name he assumed; became secretary to Viscount Tannaka, Japanese commissioner of education, then in Washington, 1872; accompanied him through Europe; and on his return to Japan founded and became president of Doshisha College at Kyoto.

Ne Exeat (nĕ ĕks'ĕ-ăt), Latin, "let him not go," part of the title of a writ issued by a court to restrain a defendant in a pending suit from leaving the country. The full English form is "*Ne exeat regno*" ("let him not go out of the kingdom"); the American, "*Ne exeat republica*." It is directed to the sheriff of the county, and commands the arrest of the defendant and his detention until he shall give security not to depart from the jurisdiction.

Negative Quantity, a quantity taken in a sense opposite to that which we have agreed to call *positive*. The terms *positive* and *negative* are correlative; if we agree to consider a quantity taken in any sense as *positive*, it will be *negative* when taken in a contrary sense. Thus if we agree to call distance estimated to the right of some point *positive*, then distance estimated to the left of that point will be *negative*.

Negligence, in law, primarily the want of care, caution, attention, diligence, skill, or discretion in the performance of an act by one having no positive intention to injure; and secondarily the omission to perform a duty imposed by law for the avoidance of injury to persons or property of others. In the civil law negligence is classed as slight, ordinary, and gross; the first being the want of great care and diligence, the second the want of ordinary care and diligence, and the last the want of even slight care and diligence. This classification is useful, but its propriety has often been denied by common-law judges. In general, any person guilty of negligence in the exercise of his rights, or failing in due time and manner or with due care to perform a duty, whereby another person sustains injury, is responsible to the party injured for the consequent damage. The chief qualification of this doc-

trine is that the party complaining of the injury must not himself have contributed to it by his own wrongful or willful act, or by his own want of ordinary care; and this rule of contributory negligence imputes to one who is under natural or legal guardianship the negligence of the guardian.

Corporations as well as persons are liable for negligence, and municipal corporations as well as others, with this restriction, that an exercise of their legislative authority is not imputable as negligence. Public officers are in general liable for their negligence, except the chief executive of the nation or state, any officers while acting in a legislative capacity, and judicial officers and others exercising a discretionary authority, and where the negligence is predicated of their discretionary acts. Where negligence results in the death of a human being, the common law gives no remedy; but this has been supplied by statutes in England and the U. S., the remedy being given to or for the benefit of the parent, husband, wife, child, or estate of the person killed.

Nego'tiable In'struments, written contracts which are transferable by indorsement or delivery, so that the transferee can enforce them in his own name, and free from any equities against prior holders, provided he takes them before maturity, for value and without notice of any defect. In these respects they differ from an ordinary evidence of liability. An assignee of such a claim cannot maintain a suit on it in his own name at common law; the assignment does not bind the debtor until notice thereof is given to him, and the assignee gets no better title than that of his assignor. If negotiable paper is payable to order, it is regularly transferable by indorsement—that is, by the payee's writing and signing on the back of the instrument a direction for its payment to his transferee, followed by delivery. If it is payable to bearer, it is transferable by delivery only. Even if the paper is payable to order, its transfer by the payee, without indorsement, will pass all his interest in it, and will give the transferee the right to compel an indorsement. By statute, in many of the U. S., he can maintain a suit in his own name on the paper, although only an assignee. In such case, however, even when a purchaser without notice, he gets no better title, until he obtains an indorsement, than his transferor had; so that if the paper becomes due, or he has notice of equities before the indorsement, he will be subject to all the defenses that existed against his transferor.

Negotiable paper ordinarily takes the form of a bill of exchange, a check, or a promissory note, but is not limited to these. Corporate bonds are treated in almost every jurisdiction as negotiable, if, containing the words of negotiability, they are issued as marketable securities, and are regarded by the mercantile community as such. See PROMISSORY NOTE.

Negrillos (nā-grēl'yōz), or **Negritos** (nā-grī'tōz), various black or negro-resembling peoples of the Pacific area. Some of the hillmen of Farther India, and possibly the Andaman Islanders, are of this stock. The wild men of

the Philippines are the typical Negrillos. They have woolly hair, longer and less crisped than the negroes. The features of most are of a decidedly African cast, but their languages are clearly not African. The skin is sometimes perfectly black. It seems generally admitted that the straight hair and less uniform features of the black Australian natives, with their peculiarities of language, separate them from the true Negrillo stock.

Ne'gro, name properly applied to the races inhabiting Africa, principally between lat. 10° N. and 20° S., and to their descendants in the old and new world. It does not include the N. Africans (the Egyptians, Berbers, Abyssinians, Nubians, etc.), nor the Hottentots in the S., although in some of the border countries there has been considerable intermixture of negro blood and dialects. The term negro, therefore, is not a national appellation, but denotes a type distinguished by certain physical characters. The Egyptians became acquainted with negroes abt. 2300 B.C., and represented them on their monuments as early as 1600. The Greeks first knew them in the seventh century B.C. The typical negroes of the Guinea coasts are generally rude and nearly naked savages, of a deep black color and ugly features; in the interior many of the tribes are fierce cannibals. Those on the Slave Coast are the most degraded. The Kaffirs of S. Africa may also be classed among negroes, as well as the races of Mozambique and the S. coast of Brazil. The skin of the negro is soft and silky, dull cherry red in the infant and growing black very soon; it differs from that of the whites principally in the greater amount of pigment cells in the *rete Malpighii*, and in the greater number of cutaneous glands. The hair differs from that of the other races in color and in its curled and twisted form.

The skull is very thick and solid, and so flat that burdens are easily carried on it. It is long and narrow, with a depressed forehead, prominent occiput and jaws, and a facial angle of 70° to 65°. The stature of the negro is seldom 6 ft., and rarely below 5½. Negroes are little subject to yellow fever, and more to cutaneous affections, and flourish under the fiercest heat and dampness of the tropics. The offspring of a negro and white is called a mulatto; of a mulatto and white, a quadroon; a greater intermixture of white blood than this can with difficulty be distinguished by the ordinary observer from a dark-skinned white. The deportation of negroes from Africa to become slaves in America began early in the sixteenth century, and was continued to such an extent and for so long a time that it is estimated that at present there are on the American continent over 20,000,000 persons of negro ancestry, about one third the number being within the area of the U. S. The slaves were chiefly derived from three sources—the coast tribes about the Gulf of Guinea, captives obtained by these from the Mandingoes and other nations of the interior, and from the Bantu tribes of the Kongo basin and S. of it. The languages of these mixed masses were soon lost, and English, Spanish, or Portuguese adopted by them. In spite of the rigors to which they were often subjected,

the rate of their increase was high and in some instances remarkable, as in the slave population of the U. S. during the twenty years before the Civil War, when it far surpassed that of the whites. See **SLAVERY**.

Negros (nā'grōs), fourth in size of the Philippine Islands; near the center of the group; somewhat rectangular in form, 140 m. long by 40 broad; area, mainland, 4,839 sq. m.; with seventeen dependent islands, 4,854; pop. (1903), comprising parts of Negros Occidental and Negros Oriental provinces, 460,776, of which 21,217 were classified as wild; capitals, Bacolod and Dumaguete. It has two or three active volcanoes and many extinct ones. The streams are little else than mountain torrents; the interior is heavily wooded. It was discovered by Goyti, 1565, who gave it the name of Negros Island because of the number of Negritos seen by him, but, 1848, Arenas found only 3,475. The most of the inhabitants are Visaya Malays, now generally professing Christianity.

Nehemi'ah, Jewish Governor of Judea under the Persians, and cup bearer to King Artaxerxes Longimanus. He is the author of at least a portion of the scriptural book which bears his name, a continuation of that of Ezra. It gives the most important events in his life, full accounts of the rebuilding of the gates and walls of Jerusalem under his energetic administration (abt. 445 B.C.), statistical information on the increase of the people, and lists of priests and Levites. The dates of his birth and death are unknown.

Neilgherry or **Nilgiri** (nēl-gēr'ē) Hills, almost isolated group of mountains in S. Hindustan, covering an area of 700 sq. m.; consist of granite, covered with a layer of rich black soil 10 ft. deep, and rise in the highest peak, Doddabetta, to the height of 8,760 ft. Their sides are covered with impenetrable jungles of tropical forests, hot, unhealthy, and swarming with wild animals; but at an elevation of about 5,000 ft. they form a table-land remarkable for its healthful climate.

Nélaton (nā-lā-tōn'), **Auguste**, 1807-73; French surgeon; b. Paris; invented a remarkable method for the immediate extraction of calculi, distinct from all the processes of lithotomy; effected many successful operations; was for many years Prof. of Clinical Surgery in the Faculty of Paris; became a senator and Academician, and was Louis Napoleon's favorite surgeon; principal work, "Éléments de pathologie chirurgicale," 5 vols., 1844-60.

Nel'son, **Horatio** (Viscount Nelson of the Nile), 1758-1805; British admiral; b. Burnham Thorpe, England; entered the navy at age of twelve; accompanied Capt. Phipps's Arctic expedition, 1773; served in the E. Indies, 1775-76; became post captain, 1779; was given command of a man-of-war, with which he proceeded to San Juan del Norte, Nicaragua; took Fort San Carlos in the San Juan River; cruised in the North Sea, 1781-82; served again in the W. Indies, 1782-87; was made captain of the *Agamemnon*, 1793, and dispatched to the Medi-

terranean; commanded a small squadron on the coast of Corsica which cooperated with Paoli, and took Bastia, May, 1794. He aided in the siege of Calvi, where he lost an eye; participated in Admiral Hotham's victory over the French squadron, March 15, 1795; took the Island of Elba; blockaded Leghorn, April to October, 1795; made commodore, 1796; distinguished himself under Admiral Jervis in the naval victory over the Spanish fleet off Cape St. Vincent, February 14, 1797; rear admiral, April, 1797; took part in the blockade and attempted bombardment of Cadiz, May to July, and in the unsuccessful attack on Santa Cruz, Tenerife, July, 1797, where he lost his right arm; made a Knight of the Bath and received a pension of £1,000. In May, 1798, he took command of the Mediterranean squadron off Toulon; followed Napoleon's expedition to Egypt and destroyed the French fleet at the Bay of Aboukir (generally called the battle of the Nile), being wounded in the engagement, August 1, 1798, for which victory he was made Baron Nelson of the Nile, and received an additional pension of £2,000.

He aided the government of Naples in resisting the French invasion and in recovering the capital after it had been taken, but stained his reputation by violating the capitulation concluded June 23, 1799, and hanging Caraccioli, the insurgent admiral; was made Duke of Bronté (Sicily) by the King of Naples; aided in the siege of Malta; was made vice admiral, 1801; was second in command of the Baltic fleet in the naval battle of Copenhagen, April 2d of that year, for which he was made viscount; took command of the squadron for the defense of England against the contemplated French invasion in July; attacked the French flotilla off Boulogne, August 15th; appointed commander of the Mediterranean fleet, May, 1803; blockaded Toulon; unsuccessfully pursued a French fleet to the W. Indies, May, 1805; returned to England in July; again took command of the Mediterranean fleet, and inflicted a total defeat on the combined French and Spanish squadrons off Cape Trafalgar, losing his life in the engagement, October 21, 1805. Lord Nelson was buried with much pomp in St. Paul's Cathedral, London.

Nelson River. See **SASKATCHEWAN RIVER**.

Nemathelmin'thes, large group of "worms," most of which are parasitic, and which from their cylindrical shape receive their systematic name as well as the common terms of "roundworms" and "threadworms." They may be recognized by their cylindrical, unjointed bodies. Externally they are covered by a thick cuticle, and no traces of appendages can be found. They are generally divided into two groups, the *Acanthocephali*, or spine-headed worms, and the *Nemotoda*, or nematode worms.

Ne'mea, valley in Argolis, Greece, between the cities of Phlius and Cleonæ; celebrated in Grecian story as the site where Argos was slain by Mercury, and where the Nemean lion was overcome by Hercules. Nemea owes its later celebrity entirely to the renown of the games held there. It was merely a stretch of

pasture land, measuring about 4 m. by 1, and hemmed in by Mts. Trikaranos, Apesas, and Tretos. On Mt. Apesas, Perseus, King of Argos, had sacrificed to Zeus; on Mt. Tretos the cave of the Nemean lion was anciently shown, with its double issue, a feature common to many grottoes now visible on Mt. Tretos. There remain at Nemea three remarkably slender Doric columns and a heap of ruins of the Doric temple of Nemean Zeus, under whose patronage the biennial games were conducted. The structure, to judge by its style, was erected only in the third century B.C., and was early destroyed, presumably by an earthquake. Nemea is now a way station 20 m. distant from Corinth on the Peloponnesian Railway, but continues uninhabited.

Nemean Games, one of the four great national festivals of the Greeks, so called from Nemea in Argolis, where they were held every second year. The first one of which the date can be approximately fixed occurred in the fifty-second or fifty-third Olympiad (572-565 B.C.). The period from one celebration to another was called a Nemead. At first only warriors and their sons could take part in them, but they were afterwards thrown open to all the Greeks. The exercises consisted of horse racing, running in armor in the stadium, wrestling, chariot racing, quoit and spear throwing, boxing, archery, and musical contests. The prize was at first a chaplet of olive branches, afterwards one of parsley.

Nemer'tine, group of low worms, almost exclusively marine, in which the usually flattened elongate body is without a body cavity, the mouth is near the anterior end, and the usually sacculated intestine terminates in a posterior vent. In front, above the mouth, is a slitlike opening from which an extremely extensible proboscis can be protruded. This is the means by which the worm obtains its food, the proboscis coiling around the prey. The larger forms live in the mud of the shores, the smaller ones swim freely.

Nemesia'nus, Marcus Aurelius Olympius, Latin poet; b. Carthage in the middle of the third century of our era; flourished at the court of the Emperor Carus, and wrote didactic poems on hunting, fishing, etc.

Nem'esia, in Grecian mythology, a daughter of Night, though sometimes called a daughter either of Erebus or of Oceanus. She was a personification of conscience, was especially the avenger of family crimes and the humbler of the overbearing, and was particularly worshiped at Rhamnus, Patræ, and Cyzicus.

Nemours (né-mô'r'), Louis Charles Philippe Raphaël d'Orléans (Duc de), 1814-96; French prince; b. Paris; second son of King Louis Philippe, who, 1831, prevented him from accepting the Belgian throne, after which he served in the Belgian campaign, and subsequently in Algeria. The refusal of the Chamber, 1840, to grant him 500,000 fr. a year led to the overthrow of the Soult Cabinet. He shared the exile of his family in England, 1848-71, when he returned to Paris. His wife,

a princess of Saxe-Coburg-Gotha, died, 1857, after bearing him two sons, the Comte d'Eu (b. 1842), husband of the presumptive empress of Brazil, and the Duc d'Alençon (b. 1844), a naval officer, and two daughters, the elder of whom married, 1872, the Polish Prince Ladislas Czartoryski. After the abrogation of the decree of exile he was restored to his former rank of *général de division* in the French army, but his name was removed from the army list, 1886, according to the law excluding from military service the members of once reigning families in France.

Nen'nus, supposed author of the "Historia Britonum" or "Eulogium Britannie," a Latin history of Britain from the arrival of Brutus the Trojan, grandson of Æneas, to 655 A.D. According to several passages of this work, the writer was a monk of Bangor, Wales, but no particulars of his career are known, and it is even disputed whether he belonged to the seventh or the ninth century.

Ne'ocene Period, division of geologic time following the Eocene period and preceding the Pleistocene; the middle part of the Cenozoic era. The animals and plants of this period include those regarded as the immediate ancestors of existing species, and to a considerable extent are identical with living forms. The greatest differences are found in the vertebrates, especially in the mammals. The strata, as compared with those of other periods, are characterized by the abundance of lake beds.

Neogramma'rians, translation of the German term *Junggrammatiker*, first applied by Friedrich Zarncke to the new school of comparative philologists which arose in Leipzig abt. 1877-78, and was distinguished by its enunciation of a stricter method of historical tests in linguistic research.

Neo-Lamarck'ism, term introduced for that school of evolutionists which believes with Lamarck that use and disuse are important factors in the development of new organs, but which differs from Lamarck in admitting that natural selection may also be an efficient element in variation. See *EVOLUTION*; *DARWINISM*.

Ne'on, gaseous element obtained from the atmosphere in 1898 by Prof. William Ramsay and Dr. Morris W. Travers, of London, England. In the liquefaction of large volumes of argon, it was found that when that element was allowed to enter a bulb cooled by liquid air it formed a liquid, and at the same time a white solid appeared on the sides and in the liquid. After standing some time this mixture was allowed to evaporate slowly, and fractions were taken off from time to time. The liquid was the first to evaporate, and nearly all of it was removed before there was any change of the solid. The latter evaporated more slowly, and the last portion became gaseous only when the bulb was removed from the protecting jacket. An examination of the gas after it had been sparked with oxygen showed the presence of a number of bright-red lines, a bright-yellow one, and less conspicuous green and blue lines. The yellow line, although equal in in-

tensity to the yellow lines of sodium, helium, and krypton, was found to have a different wave length from any of these. This gas behaves in a vacuum tube differently from any other known gases. It is rapidly absorbed by the red-hot aluminum electrodes, and the color changes from a carmine red to a brilliant orange.

Neo-Pla'tonism, philosophical school which originated in Alexandria in the third century after Christ; was professedly founded on the doctrines of Plato, but is more indebted to the ideas of Aristotle than to Plato, and denotes the last attempt of the speculative spirit of the Greek civilization to establish a scientific basis for its development. In a wider sense, the name is applied to the whole speculative tendency which grew up in Alexandria from the amalgamation of Greek philosophy, Oriental theosophy, and Jewish and Christian theology, and of which the above-mentioned philosophical school is only one individual manifestation, while it produced most remarkable intellectual characters in the most different fields of speculation.

Neo'sho River, stream which rises in Morris Co., Kan.; flows generally SSE.; enters the Indian Territory, and joins the Arkansas near Fort Gibson; is 300 m. long; chief tributary, the Cottonwood, and longer than the Neosho above the junction.

Nepal (nā-pāl'), independent state of Hindustan; between Tibet and British India; area, 54,000 sq. m.; pop. estimated at 5,000,000; capital, Katmandu. The S. part of the country consists of a belt of low land covered with tropical forests, which yield many sorts of valuable timber; the climate is hot and utterly unhealthful, and wild animals, such as elephants, tigers, and leopards, abound. From this low land the ground gradually rises, first into hills, where rice, maize, millet, sugar, indigo, and coffee are cultivated, mostly on artificial terraces along the hillsides; then into mountains, in whose elevated valleys wheat, oranges, walnuts, grapes, and other kinds of fruits are grown; and then into alps, among which are the highest peaks of the Himalaya—as, for instance, Mt. Everest—on whose pastures large herds of cattle, sheep, and goats are reared. Iron, copper, lead, tin, zinc, and salt have been found and are mined; cotton cloths and earthenware are manufactured; timber, hides, ivory, fruits, sheep, cattle, and elephants are exported. The inhabitants consist of several tribes, of which the Gurkhas, who are of Rajput descent and faith, form the warrior caste and hold the government, while the Newars, who are of Tibetan origin and are Buddhists, make the artisans of the country.

Nepen'thes. See PITCHER PLANTS.

Nepheline (nēf'ē-līn), silicate or alumina, soda, and potash, crystallizing in the hexagonal system and allied to the feldspars. It occurs in volcanic rocks; in some instances so completely taking the place of feldspar as to form a nepheline rock.

Nephi (nē'fī). See MORMON, BOOK OF.

Neph'rite. See JADE.

Nephri'tis. See BRIGHT'S DISEASE.

Neph'thys, Egyptian goddess, daughter of Seb and Nut (sky) and sister of Osiris, Isis, and Set. She is usually represented as the wife of Set, but also as the mother, by Osiris, of Anubis, the jackal-headed god of the dead. She appears principally as the companion of Isis, with whom she is represented as mourning the dead, being painted on burial chests at the head of the chest, with wings extended for the protection of the departed.

Nep'igon, large lake in the Thunder Bay district of Ontario, Canada; 30 or 40 m. N. of Lake Superior, with which it is connected by Nepigon River, emptying into Nepigon Bay of Lake Superior; about 70 m. N. and S. by 50 E. and W.; is thickly studded with islands, and has deeply indented shores; is a much-praised region for summer hunting, and especially fishing.

Nepomuk (nā'pō-mōk), John, abt. 1330-93; a saint of the Roman Catholic Church and the patron saint of Bohemia; b. Pomuk, Bohemia; was appointed court preacher to the Emperor Wenceslas, 1378. In this position he opposed and reproved with undaunted courage the suspiciousness and cruelty of Wenceslas, who had demanded that John should reveal to him the secret confessions of his wife, the Empress Sophia, daughter of Albert, Duke of Bavaria. On John's refusal, he was imprisoned, cruelly tortured, bound hand and foot, and cast into the Moldau, 1393. His body was found and buried; miracles were wrought at his grave; legends gathered around his name; and, 1729, he was canonized by Pope Benedict XIII. The Cathedral of Prague contains a magnificent monument of marble and silver to his honor. His festival is held on May 16th.

Ne'pos, Cornelius, Roman historian from upper Italy, of whose life nothing is known but that he was a friend of Atticus, Cicero, and Catullus, and that he lived between 99 and 24 B.C.; wrote various works, all of which have been lost with the exception of parts of his "De viris illustribus." The extant lives of Cato and Atticus were from the book, "De Latinis historicis." The work, "De excellentibus ducibus exterarum gentium," now commonly used as a schoolbook, and generally ascribed to Cornelius Nepos, was first printed, 1471, under the name of Æmilius Probus, an obscure writer of the fourth century, but in a new edition of 1569, Dionysius Lambinus claimed the authorship of the book for Cornelius Nepos, and identified it as a part of his lost "De viris illustribus."

Nep'tune (NEPTUNUS; called by the Greeks POSEIDON), in mythology, the principal god of the sea, and originally also of the rivers and springs. He was a son of Saturn and Rhea, and a brother of Jupiter, Pluto, Ceres, Vesta, and Juno. After Jupiter had overthrown his father, the empire of the sea fell by lot to Neptune. He had power over the clouds and storms, over ships and mariners, and over all other sea divinities. He was the creator of the

horse, and the teacher of horsemanship. The wife of Neptune was Amphitrite, by whom he had three children, Triton, Rhode, and Benthesicyme. In works of art his emblems are the trident, the horse, and the dolphin.

Neptune, most distant known planet, the eighth in order of distance from the sun, omitting the asteroids. Neptune travels at a mean distance of about 2,745,998,000 m. from the sun. The eccentricity of his orbit is less than that of any other in the solar system (excluding the asteroids) save that of Venus. The inclination of his orbit to the plane of the ecliptic is $1^{\circ} 47'$. He travels around the sun in a mean sidereal period of 60,126.7200 days, or 164 tropical years and 226.8 days. His diameter is estimated at about 37,000 m. His volume exceeds the earth's about 105 times, but his density is only 0.16 of that of the earth; accordingly his mass only exceeds that of the earth about $16\frac{1}{2}$ times. After Uranus had been watched for about a quarter of a century, it was noticed that his path was not strictly in accordance with calculations in which the perturbations produced by Jupiter and Saturn were duly taken into account. Bouvard, 1821, expressed the opinion that a planet of considerable size existed outside Uranus. The Rev. T. J. Hussey, of Hayes, wrote, 1834, to Sir G. B. Airy, the English astronomer royal, suggesting that the external planet might be detected by its action. In October, 1845, John C. Adams left with Prof. Airy a paper in which the place was indicated where the new planet would probably be found. Airy placed little reliance on the calculations of Adams, and took no measures to verify them.

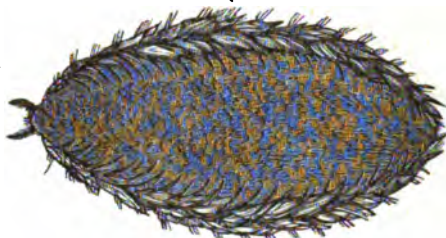
In June, 1846, Leverrier published his own independent calculation of the place of a disturbing planet, very nearly agreeing with the place assigned by Adams, 1845. Prof. Challis searched for the new planet, and actually saw it, yet failed to recognize it. Dr. Galle, of Berlin, found it, September 23, 1846. At least one satellite attends on Neptune, discovered by Mr. Lassell, of Liverpool, 1847. It travels around the planet in a period of 5 d. 21 h. 8 m., at a distance from his center equal to twelve times his estimated radius, the maximum observed elongation of the satellite from Neptune's center amounting to $18''$.

Nerbud'da, river of central India, and next to the Indus the largest river of India; rises in lat. $22^{\circ} 40' N.$ and lon. $81^{\circ} 52' E.$; crosses the peninsula with a course of 620 m., flowing a little S. of W., and falls into the Bay of Cam-bay, forming a large estuary. It is narrow and deep, but serves as a commercial highway only for the last 90 m. of its course, on account of its rapid current and numerous waterfalls.

Nereids (nē-rē-Idz), in Greek and Roman mythology, the fifty daughters of the sea god Nereus, by Doris, his wife. They were genuine Greek goddesses, who lived in the depths of the sea in a grotto resplendent with gold and silver. They were friendly to mariners and often acted as pilots, notably to the Argonauts and the Greek expedition against Troy. They were represented in art as beautiful and youthful maidens, sometimes clothed and sometimes

nude. They disported themselves on the waves of the sea along with various sea monsters, and are often depicted riding on the backs of dolphins or seated in a chariot drawn by tritons. Among the most distinguished of the Nereids were Amphitrite, Thetis (the mother of Achilles), and Galatea.

Nereids, the sea centipedes of the order of annelids, genus *Nereis*, being one of the best-known forms. They crawl and swim with facility; some live in crevices in rocks near the



COMMON SEA MOUSE.

shore, in sponges, corals, and deserted shells under stones; others burrow in mud or sand; some of the tropical species are very large, and vividly phosphorescent at night.

Neri (dā nā-rē), Filippo de' (English, ST. PHILIP NERI), 1515-95; saint of the Roman Catholic Church; b. Florence; was adopted by a wealthy uncle as his heir; secretly went to Rome to study theology and canon law; distributed his property to the poor, 1538; devoted himself to the care of pilgrims and the destitute sufferers in hospitals, and in that work was associated with Ignatius Loyola; took holy orders, 1551, and founded the order of Priests of the Oratory, approved by Gregory XIII in 1575; canonized, 1622.

Ne'ro. See CLAUDIUS.

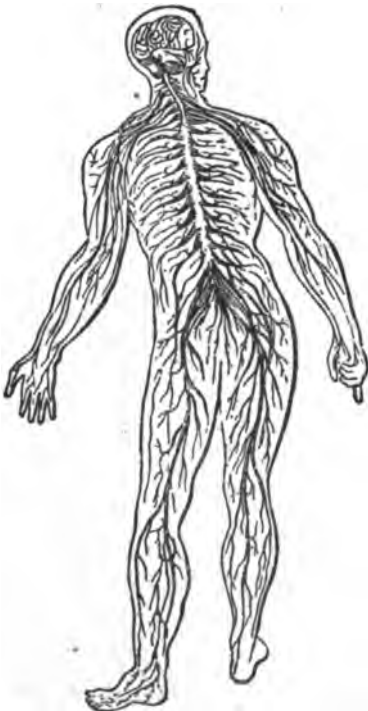
Nero, Lucius Domitius, 37-68; Roman emperor; b. Antium; son of Cn. Domitius Abenobarbus and the younger Agrippina, daughter of Germanicus; after the marriage of his mother to the Emperor Claudius, 49, was adopted by the latter, and assumed the name of Nero Claudius Cæsar Drusus Germanicus. In 53 he was married to Claudius's daughter, Octavia, and, October 12, 54, succeeded to the imperial throne by the intrigues of his mother, who kept Claudius's son, Britannicus, concealed in the palace until Afranius Burrhus, *præfectus prætorio*, had Nero elected emperor by the prætorian guard. The principal events of his reign were the long war with the Parthians, successfully conducted by Domitius Corbulo; the insurrection of the Jews, put down by Vespasian; the rebellion in Britannia under Boadicea, 61, suppressed by Suetonius Paulinus; the conflagration, July, 64, by which two thirds of the city of Rome was burned down; the rebuilding of the city by the emperor on a magnificent scale, and especially the construction of the new imperial palace, the *Aurea Domus*, etc. Dion Cassius and Suetonius say that Nero fired Rome himself, and it was asserted that, while watching the flames from a high tower,

he amused himself with singing and playing the lyre.

The most groundless suspicions and the most unnatural jealousies drove him to actions which the cruelest tyrants never have committed save in the frenzy of passion. He killed those whom he feared, Britannicus and his own mother; those who in any manner stood in the way of his whims, among whom were his first two wives, Octavia and Poppæa Sabina; and at last he killed everybody who incurred his suspicion or hatred. In 65 a conspiracy was formed against him, but it failed; Seneca, his old tutor, and Lucanus were sacrificed; but in 68, when he had just returned from a journey in Greece, where he had appeared as a singer on the stage, he was overwhelmed by an insurrection in Gaul, Spain, and Rome itself. He fled, and killed himself in the house of one of his freedmen, a few miles from Rome.

Ner'va, Marcus Cocceius, 32 A.D.-98; Roman emperor; was twice consul before his accession to the purple. On the assassination of Domitian, Nerva was proclaimed emperor by the people and soldiers. He discontinued Domitian's persecutions for treason, discountenanced informers, permitted exiles to return, distributed land among the poor, economized the revenue, and increased the resources of his empire.

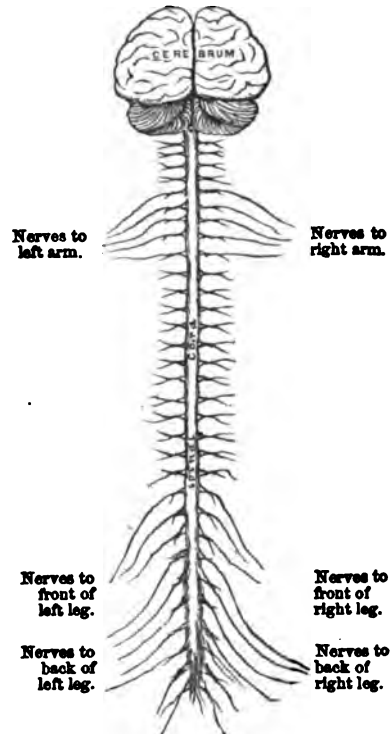
Nerval', Gérard de. See GÉRARD DE NERVAL.



THE NERVOUS SYSTEM.

Nerves, the cords of communication between the central nervous system and the peripheral parts—the skin, internal surfaces, muscular ap-

paratus, organs of special sense. These cords vary in diameter from a microscopic dimension to 10 mm.; their lengths also vary widely, from a few lines to 2 ft. and more. Every nerve, whether microscopic or larger in size, is a compound structure made up of nervous and connective tissue. The functions of nerves are general and special. As general functions or properties are recognized (1) conductivity, (2) excitability. By the former, sensory impressions are conveyed from pe-



BRAIN AND SPINAL CORD, WITH THE THIRTY-ONE PAIRS OF SPINAL NERVES.

ripheral parts through nerve fibers centripetally to the nervous centers; the spinal cord and brain are thus affected by the external world. Again, conduction takes place in a centrifugal direction, motor excitations being sent from the nervous centers to peripheral apparatus; the activity of the organism is made externally manifest. Excitability is the property which nerves have of reacting to impressions independently of the nervous centers—a property which, after section of a nerve, survives for about three days in the distal portion. The special functions of nerves are treated of under other headings. A very important function of certain nerve fibers is that relating to nutrition. It is known that when certain fibers of a nerve are cut, atrophy and degeneration take place in the parts supplied by this nerve. These fibers, known as trophic fibers, are probably present in most nerves, but especially in certain ones. Another highly important set of nerves are those which govern the blood vessels

and regulate their state of contraction or distention. In this way these nerves are also closely concerned with nutrition. Nerves are liable to various diseases, such as inflammation (neuritis), or tumors (neuroma), and often receive injuries.

Nervii (nér-vi-i), ancient Belgic race, probably of Germanic or Dutch stock, who desperately opposed Cæsar in several bloody wars (57-52 B.C.). Their chief towns were Bagacum (Bavay) and Camaracum (Cambrai).

Nervous Diseases, affections of the nervous system—that is, of the brain, spinal cord, or external nerves. They may be either functional or organic. By functional nervous diseases are meant usually such as present no anatomical alteration of nerve structure to the naked eye or to other means of examination at our command. These are often spoken of as neuroses. Many vague conditions are included in this group, and in the course of many organic diseases of other parts of the body nervous disorders of a functional, probably often toxic, nature are developed. The term nervousness is applied loosely to many distinct conditions; but there is a form of unstable nervous equilibrium which has occupied much attention of late, and which is variously known as nervous exhaustion, nervous breakdown, and neurasthenia. This disorder assumes many forms, according to the part of the nervous system involved and the causes at work. It is of immense importance to recognize it as a distinct affection as well as its influence in furthering other and organic diseases. Overwork, excesses, and disease are at the bottom of this, which is really a condition of wasted nerve force. Epilepsy, hysteria, certain forms of insanity, and neuralgia are among the more serious nerve disorders of the functional kind. Heredity often plays a part in them.

The organic affections of the nervous system may be classified, as are the diseases of other organs, by the nature of the structural changes. These may be anemia, congestion, inflammation, degenerative changes, malignant growths, and the like, as elsewhere. An ideal system of classification would take these changes alone into consideration. Unfortunately, however, the knowledge of the physiology and pathology of the nervous system has not yet reached the point where this is possible. We are constrained to group together nervous diseases whose external manifestations or symptoms are the same when in reality their essential nature is probably widely different. Thus we recognize St. Vitus's dance by certain symptoms; yet it is probable that this is not essentially a disease, but a form of expression of various diseases.

Nesselrode (nès-èl-rö-dé), **Karl Robert** (Count von), 1780-1862; Russian statesman; b. Lisbon, where his father was Russian Ambassador; entered early on a diplomatic career; gained the confidence of the Emperor Alexander; was made Minister of Foreign Affairs, 1812; and took a prominent part in all the negotiations with France and the allies at the close of the Napoleonic wars. He represented Russia at the Congress of Vienna, and afterwards at the con-

gresses of the Holy Alliance, usually favoring a peaceful and moderate policy. At Aix-la-Chapelle, 1818, he showed great zeal in the interest of France, urging that the occupation of that country by the allies should cease. For this he was rewarded by the French Govt., which added enormously to his wealth. He became Vice Chancellor of the Empire 1829, Chancellor 1844, and governed the relations of Russia with foreign powers to 1856, when, after signing the Peace of Paris, he retired to private life.

Nes'tor, legendary Grecian hero, son of Neleus and Chloris, and King of Messenian or of Triphylian Pylos. He went to Troy with sixty ships, at a great age, having ruled three generations of men, and during the siege figured as soldier, counselor, and orator, his superior wisdom being appealed to in all dissensions. He returned home in safety after the fall of Troy.

Nestor, abt. 1056-1114; earliest Russian chronicler; b. Kiev. In his seventeenth year he entered the Petcherskoi Convent of Kiev, where he wrote his annals of Russia, from the appearance of the Varangians in that country, about the middle of the ninth century, to his own times. The work was altered and continued by others, and has been translated into German.

Nesto'rians, sect of early Christians, so called after Nestorius, Bishop of Constantinople in the fifth century. Before the close of the sixth century his followers were numerous in the East, penetrating even to India, Tartary, and China. A portion of them adhered to the Monophysite heresy. The Nestorians were especially strong in Persia, where at one time they were the dominant sect. As Mohammedanism advanced, the Nestorians were borne down before it, and many were destroyed by Tamerlane; so that the Nestorians of to-day are but a feeble remnant of a once powerful people. They dwell in the NW. districts of Persia, spreading into the Kurdish Mountains, a small portion residing within the borders of the Turkish Empire. About 40,000 are on the Plain of Urumiah, chiefly occupied in agriculture. They are poor, and often subject to oppressions from their Kurdish neighbors. Mesara, Smith and Dwight, missionaries of the American board, found them, 1831, maintaining their ancient faith, but sunk in ignorance and degradation.

They had the Bible in the ancient Syriac; it was venerated as a relic, but not read nor understood, except by the priests. Many of the priests scarcely understood the church service. They professed the Nicene Creed with a few modifications, rejected the doctrine of purgatory, yet prayed for the dead, and acknowledged seven sacraments; they allowed marriage to all the clergy except bishops and the patriarch, and discarded auricular confession. American missionaries began to reside among them, 1833; reduced the spoken language to writing, translated the Scriptures and numerous other works into it, and established schools. Their object at first was merely to reform the Church; but many of the native ecclesiastics who had aided them finally drew back, and new societies were organized.

Nestorius, d. abt. 440; Syrian bishop; was a presbyter of Antioch, and was made Patriarch of Constantinople, 428. In his opposition to Apollinarianism, Nestorius maintained that there was a great distinction between Christ as the Son of God and Christ as the son of man; that the actions and sensations of the one person were to be carefully discriminated from those of the other; and that the Virgin Mary could not be called "mother of God," but only "mother of Christ," because it was only the human nature of Jesus Christ that was born of her, since God could neither be born nor die. Cyril, Bishop of Alexandria, his chief opponent, induced the Emperor Theodosius II to call a general council at Ephesus, 431, at which Cyril presided. Nestorius was condemned, deprived of his bishopric, and banished. He was sent first to Arabia Petraea, and afterwards to one of the oases of Libya, where he died.

Nests. See **BIRDS' NESTS.**

Neth'erlands, The, kingdom of W. Europe; bounded E. by Germany, S. by Belgium, and W. and N. by the North Sea, which indents the coast with two large inlets—the Zuyder Zee and the Dollart; area, 12,648 sq. m.; pop. (1907) 5,747,269. The country is also known as Holland, but The Netherlands is its official designation. It is divided into the provinces of N. Brabant, Guelders, S. Holland, N. Holland, Zeeland, Utrecht, Friesland, Overijssel, Groningen, Drenthe, and Limburg. The chief cities are Amsterdam, the capital; The Hague, the seat of government and the residence of the royal family; Rotterdam, Utrecht, Groningen, Haarlem, Arnheim, and Leyden. It has a number of colonies, which are divided into two groups—the Dutch E. Indies and the Dutch W. Indies. The former includes Java, Madura, Bali, Lombok, Banca, Billiton, the Moluccas, Timor, Sumatra, Celebes, and parts of Borneo and New Guinea; area, 736,400 sq. m.; pop. 38,000,000. The Dutch W. Indies include Dutch Guiana, or Surinam, and Curaçao; area, 46,463 sq. m.; pop. 130,000.

As the name indicates, the Netherlands are low and flat, and form the delta of the rivers Rhine, Maas, and Scheldt; but the naturally formed sand banks or dunes on some parts of the sea coast attain a considerable height. The country is intersected by the rivers mentioned and their branches, the Waal, Yssel, Leek, and Vecht. Among the canals, of which there are 1,907 m., serving partly for drainage, partly for communication, the most important are the N. Holland Canal, the N. Sea Canal, and the New Waterway, built 1870-85, connecting Rotterdam with the North Sea. A few lakes are found in the province of N. Holland, but Haarlem Lake, formerly the largest of them, was drained 1839-52. The climate is temperate but variable. Fevers of a malarial character, colds, and bronchial and pulmonary affections are apt to follow on the sudden changes in winds and temperature. The country is fairly healthful, however, except in districts where the soil is marshy. The greater part of the country is of alluvial origin; minerals are nowhere found, except a kind of clay well adapted for tiles, brick, and pottery, and a little coal in the province of

Limburg, where the mines belong to the state. Agriculture flourishes most in Friesland (where the finest cattle are reared), N. Holland, and parts of Gelderland and Limburg. Rye, barley, and wheat are the chief cereals produced, but fruit and vegetables form a large item of export, especially to England. Potatoes, tobacco, hemp, flax, and beet root are also staple products. The raising of flower bulbs has been carried on for centuries, and is still the leading branch of floriculture in the Netherlands.

Of manufactures, the most important are cheese, gin, chocolate and cocoa, potteries, linens, carpets, refined sugar, long-stemmed clay pipes, beet sugar, potato starch, and cotton goods. The fisheries contribute a large amount to the national wealth; herring, cod, salmon, turbot, and anchovies are taken on the coast, and oysters are found in the waters surrounding and intersecting the province of Zeeland. Commerce is principally carried on with the Dutch colonies, Great Britain, the countries on the Baltic, and the U. S. The chief imports from the U. S. are wheat, Indian corn, raw metals, petroleum, and margarin. Holland is practically a free-trade country, the average import duty being only 5 per cent *ad valorem*. The people form in blood and language a branch of the Teutonic race. They are characterized especially by industry, perseverance, cautiousness, frugality, scrupulous cleanliness, and a certain sedateness of manners; they are prosperous and contented, and their wealth is quite equally distributed. Some 2,480,000 are adherents of the Dutch Reformed Church; there are about 599,000 other Protestants, 1,790,000 Roman Catholics, 8,800 Jansenists, and 133,000 Jews. Four universities—those of Leyden (founded 1575), Groningen (1614), Utrecht (1636), and Amsterdam (1632)—all conferring degrees in law, medicine, philosophy, and letters, are attended by about 3,400 students. The special schools include several military schools, a national academy of art, a royal school of music, and several normal schools.

The government is a constitutional and hereditary monarchy. The reigning dynasty is the house of Orange-Nassau, now extinct in the direct male line. The national legislature consists of two branches—the First and Second Chamber of the States General. The executive power vests solely in the sovereign; the legislative, jointly on the sovereign and the legislature; but the First Chamber lacks the right of introducing or amending bills. The presidents of both chambers are appointed by the sovereign from among the members. The cabinet consists of nine ministers, appointed by the sovereign. The provinces are governed by royal commissaries, appointed by the sovereign; and each has its legislature. The peace strength of the army amounts to 41,055 of all ranks and arms. The navy has some 510 officers and 8,000 seamen. The marine infantry consists of about 50 officers and about 2,200 noncommissioned officers and privates.

The Netherlands, or Low Countries, when first spoken of in history, comprised not only the present kingdom of The Netherlands, but also Belgium and the extreme N. parts of France. It was inhabited by three distinct though kin-

dred tribes—the Frisians to the N., the Batavians, of German stock, in the center, and the Belgæ, of Gallic stock, to the S.—all of whom were eventually conquered by the Romans. On the establishment of the great Frankish Empire under the Carolingians the country was incorporated and the population Christianized; but by the division of the empire of Charlemagne the country was divided, the S. part falling to France, the central to Lothringia, and the N. to Germany. Between 1384 and 1443 the Burgundian dukes gained possession of the whole country; 1477 the Netherlands came into possession of the house of Hapsburg; and by the division of Charles V's empire they fell to Spain. The efforts of Philip II to root out the Reformation led to a war, 1566; to a union between the seven N. provinces, 1579, and to an armistice between Spain and the Netherlands, 1609; but not till 1648 was the independence of the country formally acknowledged. The S. provinces, nearly corresponding to the present Belgium, being Roman Catholic and French or Flemish speaking, remained with Spain.

The Netherlands came to share with England the supremacy of the world in maritime affairs, several times defeated that country, crushed the Spaniards, and acquired possessions in America and the E. Indies. Their greatest glory was their resistance to Louis XIV. Jealousy of England led, 1782, to a war which caused the decline of their maritime power. The country was conquered by the French, 1794-95, and the Batavian Republic created; made the Kingdom of Holland under Louis Bonaparte, 1806; incorporated with France, 1810; reestablished as the Kingdom of Holland, 1815, the former Spanish Netherlands being joined with it. A revolution in Belgium, 1830, led to the separation of that country and its erection into a kingdom. By the accession to the throne of Queen Wilhelmina, 1890, Luxemburg was separated from the Netherlands through the operation of the Salic law.



SMALL NETTLE (*Urtica Urens*), SHOWING STAMINATE AND PISTILLATE FLOWERS.

Net'tle, any one of many plants, mostly covered more or less densely with poisonous stinging hairs. They belong to the family

Urticaceæ, and mostly to the genus *Urtica*. There are over thirty species, many of which are tropical, some of the latter having severe and even dangerous stinging powers. The stalks of some kinds abound in a strong fiber, which, especially in Asia, has a considerable use in the arts. The common nettle fiber is employed like hemp in Italy. This species (*Urtica dioica*) is naturalized in the U. S. from Europe. The most common stinging nettles of the E. U. S. are, besides the above, the *U. urens*, also European, *U. chamædryoides* and *gracilis*, and *Laportea canadensis*.

Nettle Rash, or Hives, an inflammatory affection of the skin with effusion, causing elevations of the size of a pea, or larger. These wheals are pale, or pale with a red margin, or red, or pale with a small vesicle in the center. The disease is generally of an acute character; the elevations develop quite suddenly and disappear after hours or days. Frequently they return, and some people do not lose the predisposition for many years. They may return at regular or irregular intervals, every day or two, without necessarily having anything in common with intermittent fever. The cause of this condition is either local or systemic. Among the local causes are contact with nettles, from which it has its name; the influence of insects, a hot bath, the sun, and mechanical and chemical influences of different kinds. In predisposed persons, pressure with the finger, friction, or irritation as by a subcutaneous injection of an indifferent fluid, are sufficient to produce it. Among the systemic causes are substances which irritate the nerves of the blood vessels or of the digestive or genitourinary organs; certain articles of food, such as champagne, beer, sausage, strawberries, raspberries, currants, oysters; medicines, such as quinine or cod-liver oil.

At times the condition can be traced to no cause, and then a general irritability of the nervous system must be assumed to produce it. Frequently, therefore, it sets in with a chill or with fever, and it is always accompanied by itching and burning. Treatment, although simple, is not always efficient. Locally the use of glycerin, cold cream, weak solutions of carbolic acid ($\frac{1}{2}$ per cent), salt-water bathing, etc., will relieve the itching. The diet must be regulated; no coffee, spice, beer, and but little meat must be taken. The stomach must be improved by the use of bismuth or hydrochloric acid, according to the indications. Mild purgatives will be beneficial; in very bad cases now and then an emetic.

Nettle Tree. See HACKBERRY.

Neuchâtel (né-shä-tél'), (1) canton of Switzerland, bounded by France and Lake Neuchâtel; area, 312 sq. m.; pop. (1905) 131,481; was an independent principality as early as 1034; came into the hands of the King of Prussia; joined the Swiss Confederacy, 1814, but maintained its monarchical government; adopted a republican constitution, 1848, after the King of Prussia had renounced all his rights therein, and definitely became a member of the Swiss Confederation, 1857. (2) The capital city of the canton; on the shore of Lake Neuchâtel;

24 m. W. of Bern; is especially noted for its manufactures of laces and watches and its trade in wine and absinthe. Pop. (1908) 23,395. (3) A lake 25 m. long, from 3 to 5 m. broad; sends its waters through the Aar to the Rhine.

Neuendorff (noi'en-dörf), Adolph, 1843-97; German-American composer and conductor; b. Hamburg; settled in New York, 1855; became chorus master of the German Theater, 1857, and soon after violinist in the orchestra of the Stadt Theater; appeared as pianist, 1859; subsequently was conductor of theaters in Milwaukee and New York; introduced Wachtel and Mme. Pappenheim to New York; conducted a series of Wagner's operas, 1877; and composed several successful operas.

Neuilly (né-yé'), town of France; department of Seine; on the Seine River, there crossed by a noble stone bridge; is practically a suburb of Paris; was the famous summer residence of Louis Philippe, who occupied the royal chateau erected in the reign of Louis XV, which was destroyed by the mob February 25, 1848, the right wing alone being saved, which yet forms an object of interest to visitors. The beautiful grounds about Neuilly, once the favorite resort of Parisians, are now laid out in walks skirted by charming villas. Pop. (1906) 41,145.

Neukomm (noi'kôm), Sigismund (Chevalier), 1778-1858; German composer; b. Salzburg; was educated by his kinsmen, Michael and Joseph Haydn; leader of opera orchestras in St. Petersburg, Paris, and London; produced the oratorios of "Mount Sinai" and "David" and more than 800 compositions, vocal and instrumental.

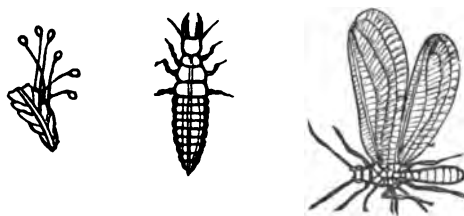
Neumann (noi'män), Karl Friedrich, 1798-1870; German Orientalist; b. Riechmannsdorf, Bavaria, of Jewish parents; made a journey to India and China, 1829-30; brought back a large collection of Chinese and Hindu books, which are now partly in Berlin and partly in Munich; appointed Prof. of Oriental Languages at Munich, 1831, but dismissed, 1852, on account of his liberal views in politics; removed, 1863, to Berlin, and died there; was a very prolific writer on various topics. His principal works are "Mémoires sur la Vie et les Ouvrages de David," "Philosophie Arménien," "Lehrsaal des Mittelreichs," "Geschichte der armenischen Litteratur," "Asiatische Studien," "Die Völker des südlichen Russland," "Ostasiatische Geschichte," "History of Vartan, by Eliseus," and "Chronicle of the Armenian Kingdom in Cilicia, by Vahram," translated from the Armenian. He also wrote "Geschichte der Vereinigten Staaten von Nordamerika" and "Hoein Schein, or the Discovery of America by Buddhist Monks."

Neu Pommern (noi pôm'mérn), or **New Pomerania**, formerly **NEW BRITAIN**, largest island of the Bismarck Archipelago; lies off the NE. coast of New Guinea; extreme length, 300 m.; breadth, from 5 to 50 m.; area, 10,000 sq. m.; separated on the W. from Papua by Dampier's Strait and on the NE. from New Ireland by St. George's Channel. At Spacious Bay there is supposed to be a channel extending

across the island. In the interior are high mountains, and in the N. active volcanoes. The principal productions are palms, sugar cane, bread fruit, pigs, turtles, and fish; inhabitants, Negritos.

Neural'gia, pain in a nerve due to functional disturbance either in its central or peripheral extremity. If inflammation be present in the nerve trunk, neuritis is a more proper designation. The disease is rarely met with in children, and is more frequent in women than in men. The causes are debility, exposure to cold, anæmia, reflex irritation, as in facial neuralgia from a decayed tooth; rheumatism, gout, diabetes, malaria, and lead poisoning. The pain is localized in the distribution of a certain nerve or nerves, and rarely occurs on both sides at once. It is paroxysmal, lasting from a few minutes to many hours, and is deep-seated, sharp, burning or boring, and darting. In the intervals there may be a dull ache. The skin, especially at certain points on the affected nerve, is extremely sensitive to pressure. Local oedema, sweating, or redness may occur. The hair may become gray in spots, or even fall out. Neuralgias are classified according to the part affected. The following are the principal varieties: Facial, intercostal, brachial (involving the arm), crural (involving the front of the thigh), sciatica, coccygodynia (causing intense pain at the end of the spine, made much worse by sitting), erythromelalgia (in which there is great pain in the heel or sole, with hyperæmia or cyanosis). There are also neuralgias of the internal organs, of which gastralgia (neuralgia of the stomach) and nephralgia (neuralgia of the kidney) are examples.

Neurop'tera, name applied with different limitations by different authors to a group of insects. By some it used to include the day flies (*Ephemerida*), dragon flies (*Odonata*), stone flies (*Plecoptera*), white ants (*Isoptera*), book lice (*Corrodentia*), scorpion flies (*Panorpata*, or *Mecoptera*), caddis flies (*Trichoptera*),



EGGS, LARVÆ AND ADULT OF CRYZOPAPERIA.

and the hellgrammites and ant-lions. By others its use is limited to the last-named forms. With its wider signification it is difficult of definition, but it may be said to include those forms of insects in which the mouth parts, like those of grasshoppers, are fitted for biting and in which the gauzy wings are provided with numerous cross veins.

Neurot'ics, in medicine, such drugs as are capable of primarily affecting the functions of intellection, sensibility, or motility. Alcohol, the ethers, chloral, potassium bromide, amyl-

nitrite, the drugs of the opium type, quinine, strychnine, hemlock, Calabar bean, aconite, digitalis, etc., are neurotics.

Neusiedl (noi'séd'l), Lake of, body of water in Hungary; near the NW. frontier; 23 m. long and 7 m. broad. Its water contains various salts in solution, and has a braekish taste. The lake sometimes dries up entirely. Under sudden risings of the water a canal conducts it to the Rabiniz River.

Neustria (nūs'tri-ä), W. division of the Frankish Empire under the Merovingians and Carolingians. The Meuse formed its boundary toward Austrasia, the E. division; the Loire separated it from Aquitania, and it included Paris. In later times it was restricted to the territories between the Seine and the Loire. After 400 years the name disappeared when the maritime territory was ceded to the Normans (912), and took the name of Normandy.

Neutral Axis, line in a cross section of a beam which is neither extended nor compressed when the beam is deflected by a load. This line passes through the center of gravity of the cross section, provided the elastic limit of the material be not exceeded.

Neutrality, state of peace which a nation observes while some of its friends are at war. Anciently, such a condition can hardly be said to have existed, for wars were general and every state was either the ally or the enemy of every other. In nothing can the progress of society be so clearly seen as in the increasing growth and importance of the neutral status. Neutrality is not only a privilege to be free, so far as is possible, from the losses and evils of war; it is also a duty to avoid aiding either belligerent, remembering that the other is a friend. The position which a state intends to take in view of a war between its neighbors should be clearly defined. It is accordingly customary to issue a proclamation of neutrality, laying down the rules which are to govern its intercourse with both belligerents alike; the privileges, if any, which they may expect; the obligations which it will itself recognize, and the duties thereby devolving upon its subjects. Besides such proclamations in view of a particular war, it is also customary for a state to put on its statute books general laws regulating the actions of its citizens with reference to foreign wars. These are neutrality acts. They are only municipal laws, it is true, yet their violation by the subjects of a state may be ground for damages against it in favor of an injured belligerent, as was proved in the *Alabama* case. The nonexistence or insufficiency of such laws is no excuse for a failure to observe a strict neutrality, but may rather be a cause of complaint. See **BELLIGERENCY**; **INTERNATIONAL LAW**.

Neville (né-vél'), **Alphonse Marie de**, 1836-85; French military painter; b. St. Omer; pupil of Picot; officer of Legion of Honor, 1881; began life as a lawyer, but soon abandoned it for art; with his pictures of episodes of the Franco-German War of 1870 reached the highest rank among modern battle painters; compositions notable for action and vig-

orous draughtsmanship; one of the best is "The Defense of Le Bourget," in the collection of Mrs. W. H. Vanderbilt, New York.

Neva (nāvā), river of Russia; connects Lake Ladoga with the Gulf of Finland; is 35 m. long; has a curved and sinuous course, with many bars and other obstructions to navigation at its head and mouth, and a series of rapids about midway of its length. It is broad and deep, and the obstructions to navigation have been measurably overcome by engineering works. St. Petersburg occupies the islands of its delta.

Nevada (né-vā'dä), **Emma** (stage name of **EMMA WIXOM**, later Mrs. **RAYMOND PALMER**), 1862- ; American prima donna; b. Austin, Nev.; studied under Mme. Marchesi in Paris; made her début in London as *Amina* in "La Sonnambula," 1880; sang in the chief capitals of Europe; made a tour of the U. S., 1885; married that year and made residence in Paris; favorite rôles, *Amina*, *Lucia*, and *Mignon*.

Nevada (named from the Sierra Nevada range), popular name **SILVER STATE**, state in the W. division of the N. American union; bounded N. by Oregon and Idaho, E. by Arizona and Utah, SW. and S. by California; extreme length N. to S., 483 m.; greatest breadth, 423 m.; area, 110,690 sq. m.; pop. (1910) 81,875; principal towns and cities, Reno, Virginia City, Carson City (the capital), Winnemucca, Goldfield, Tonopah. Surface



chiefly a plateau 4,000 ft. above the sea, crossed by mountain ranges, generally parallel to each other and having a course from N. to S., giving no outlet for the streams. In the W., Humboldt and S. Toyak ranges are peaks 10,000 to 12,000 ft. high. About 12,000 sq. m. in the SE. belong to the Colorado River basin. There are extensive areas called deserts. Principal rivers, the Truckee, Humboldt, Walker, Carson, Quinn, Reese, Virgin, and Colorado, the last named forming a part of the SE. boundary. Principal lakes, Pyramid (33 m. long), Walker, Carson, Humboldt, Winnemucca, and Tahoe, one third of which is in the state.

Climate, though characterized by great extremes, healthful and invigorating; fall of the mercury in January from 10° to 16° below

zero, and much lower in the mountains; dry season prevails from about the middle of June until October, and the temperature occasionally rises to 100°, though it falls every night to between 70° and 80°, and in July and August does not average more than 90° at mid-day. Principal mineral products, gold, silver, copper, lead, nickel, iron ores, salt, lignite coal, antimony, graphite, gypsum, sulphur, granite, carbonate of soda, manganese, sulphuret of zinc, borax, mica, and clays of many kinds. Value mineral products (1910), \$34,617,127, including gold, \$18,873,700, and silver, \$6,677,600. Agriculture fairly successful, but usually dependent on irrigation; grazing lands abundant in the valleys and stock raising an important activity; production of principal crops (1911): Spring wheat, 650,000 bu.; oats, 360,000 bu.; barley, 480,000 bu.; potatoes, 1,280,000 bu.; hay, 864,000 tons. Chief manufacturing industries, the milling and smelting of metals, sawing of lumber, grist milling, and the repair and construction of railway cars. "Factory-system" plants (1909), 177; capital employed, \$9,806,000; value products, \$11,887,000.

Leading religious denominations, Methodist Episcopal, Roman Catholic, Protestant Episcopal, Presbyterian, and Baptist, and Church of Latter-Day Saints. The State Univ. at Reno is the only important educational institution. Nevada is a part of the territory ceded to the U. S. by Mexico by the Treaty of Guadalupe Hidalgo, February 2, 1848. It was at first a part of California Territory; was subsequently attached to Utah; constituted a territory, 1861, with smaller boundaries than at present; constitution ratified and territory admitted into the Union as a state, 1864. Additions were made to its territory by congressional enactment, 1866.

Nevers (né-vâr'), ancient *Noviodunum*, or *Nevirum*, capital of department of Nièvre, France; on the Loire, at the influx of the Nièvre, 159 m. SSE. of Paris; town is old and ill-built, with narrow, crooked streets, but has beautiful promenades, extensive manufactures of iron and copper ware, chemicals, porcelain, cloth, and linens, and large tanneries, breweries, and cannon foundries. It has been the see of a bishop since 506; its cathedral dates from the thirteenth and fourteenth centuries; and there is a stone bridge of fifteen arches over the Loire. Pop. (1900) 27,673.

Nevin, Ethelbert, 1862-1901; composer; b. Edgeworth, near Pittsburg, Pa.; studied piano-forte under B. J. Lang, of Boston, and harmony under Stephen A. Emery; went to Berlin in 1884 for further study, and returned to Boston in 1887; was again in Europe, 1890-92; later he resided in Boston, occupying his time in composing, teaching, and occasionally playing in public. His first composition was published in 1888. He published many songs and piano pieces, which have become widely and favorably known.

Nevis, island of the British W. Indies, in the Leeward group; is 3 m. wide and 4 m. long, and rises by gradual slopes to a height of 3,200 ft. It was discovered by Columbus,

1498, and was settled, 1628, by English emigrants from St. Christopher, with which it forms a presidency, with one legislative council, meeting at St. Kitts. The island was taken by the French, 1706; was restored by the Peace of Utrecht; was taken again by the French, 1782, and restored in the following year. Capital, Charlestown; has a good roadstead. Pop. (1901) 12,774.

New Albany, capital of Floyd Co., Ind.; on the Ohio River; 3 m. W. of Louisville, Ky.; derives excellent power for manufacturing from the falls of the Ohio, 2 m. distant, and has a large commerce by rail and water. The principal industries are the manufacture of iron and steel, cotton, woolen, and hosiery goods, plate glass, and tanned leather. The city has a Masonic temple, Odd Fellows' hall, De Pauw College for Women, public high school for white pupils, Scribner High School for colored youth, and college, township, and city libraries. Pop. (1910) 20,629.

New Amsterdam, old name of New York City, adopted on the arrival of Governor Petrus Stuyvesant, 1647. Previous to that date the village was called Manhattan. On its capitulation, 1664, to the English, its name was changed to New York.

Newark, capital of Essex Co., N. J.; on the Passaic River and the Morris and Essex Canal and several trunk line railways; 9 m. W. of New York City; settled by families from Milford, Branford, and Guilford, Conn., 1666; chartered as a city, 1836; widely noted for the extent and variety of its manufactures, on which the U. S. census, 1909, reported 1,858 "factory-system" plants, operated on a capital of \$154,233,000 and yielding products valued at \$202,511,000. The principal articles are malt liquors, leather, jewelry, foundry products, iron and steel, machinery, electrical supplies, varnish, chemicals, fertilizers, carriages, thread, boots and shoes, cutlery, tools, celluloid, and dressed stone. Notable buildings include a U. S. Govt. building, new county courthouse, new city hall, public library, New Jersey Historical Society Building, home plants of the Prudential and Mutual Benefit Life Insurance companies, Howard Savings Institution, old and new (erecting) St. Patrick's Cathedral (Roman Catholic), several large department stores, new public high school, and many striking edifices among more than 300 churches. Several of the chain of new county parks are within the city, which also has Washington Park, Military Park, and Lincoln Park.

The city and its environs, extending throughout the county, are noted for their excellent roads. Newark has an extensive system of waterworks (cost about \$10,000,000); is a port of entry; has exceptional railway facilities and considerable river traffic; public school property valued at over \$3,500,000; and trolley connections with all parts of the state. The charitable and benevolent institutions include the Orphan Asylum, Foster Home, Home for the Friendless, Krueger Home for Aged Men and Women, Faith Home, Home for Incurables, Job Haines Home, Home for Crippled Children,

Day Nursery and Baby Shelter, St. Barnabas, St. Michael's, and the German hospitals, Hospital for Women and Children, Babies' Hospital, Newark City Hospital, and the Charitable Eye and Ear Infirmary. Clubs and fraternal organizations are numerous and prosperous. Besides its manufactures, the city is noted for its large life- and fire-insurance interests. Pop. (1910) 347,469.

Newark, capital of Licking Co., Ohio; on the Ohio and Erie Canal; 33 m. NE. of Columbus; is in an agricultural, coal mining, and natural gas region; has a large trade in coal, grain, and live stock; and has car shops of the Baltimore & Ohio R. R., and manufactures of glass, portable engines, stoves, iron bridge work, paper, wire cloth, carriages, flour, lumber, and soap. Pop. (1910) 25,404.

Newark Sys'tem, in geology, a group of rocks of Mesozoic age, occurring in isolated tracts near the Atlantic coast from Nova Scotia to the Carolinas. Except in Nova Scotia they are sharply separated by unconformity from Archæan and Paleozoic rocks beneath and from Cretaceous and Cenozoic strata above. They are further contrasted by their prevailing red color, and they are distinguished from later formations by high dips. The system has received much attention from geologists, and, being of doubtful age, has been called by many names. The largest tract follows the SE. margin of the Appalachian Mountains from S. New York across New Jersey, Pennsylvania, and Maryland into Virginia, and smaller areas carry the same trend to N. Carolina. A more E. belt is represented near Richmond, Va., and in central and S. N. Carolina. A large tract occupies the Connecticut valley in Massachusetts and Connecticut, and other tracts border the Bay of Fundy in Nova Scotia.

New Bedford, one of the capitals of Bristol Co., Mass.; on the Acushnet River; 56 m. S. of Boston. The city has regular steamboat communication with Martha's Vineyard, Nantucket, and New York City, and has become an important coal-shipping point. The beautiful harbor in Buzzard's Bay is protected by a granite fortification on the extremity of Clark's Point, which is connected with the heart of the city by an avenue 4 m. long. For more than a hundred years the city was the chief seat of the U. S. whale fishery, but since 1854 it has declined steadily. As this industry declined local capitalists turned their attention to manufacturing, and, 1909, there were 207 "factory-system" plants, employing an average of 28,566 hands, and yielding products valued at \$53,238,000, the chief ones being a group of cotton and woolen mills. New Bedford is a leading center for the production of fine cotton yarns and cloth. Pop. (1910) 96,652.

Newberry, John Strong, 1822-92; American geologist; b. Windsor, Conn.; settled as a physician in Cleveland, Ohio, 1851. Appointed acting assistant surgeon and geologist in the expedition under Lieut. Williamson to explore the country between San Francisco and the Columbia River, 1855. In 1857-58 he accompanied Lieut. Ives in the exploration of the

Colorado River; 1859, was connected with another party sent out by the War Department for the exploration of the San Juan and upper Colorado rivers; 1866, was appointed Prof. of Geology in the School of Mines of Columbia College, New York; 1869, became also State Geologist of Ohio; was one of the original incorporators of the National Academy of Sciences; president of the American Association for the Advancement of Science, 1867; of the New York Academy of Sciences, 1867-91; of the Torrey Botanical Club, 1880-90, and of the International Congress of Geologists, 1891; received the Murchison medal of the Geological Society of London, 1888. During the Civil War he was a member of the U. S. Sanitary Commission, and to him was delegated the organization and direction of all its operations in the valley of the Mississippi. His publications were chiefly in the department of geology and paleontology, but also included papers on botany and zoölogy.

New Brit'ain. See BISMARCK ARCHIPELAGO.

New Britain, city in Hartford Co., Conn.; 9 m. SW. of Hartford; contains a Roman Catholic cathedral, state armory, state normal school, New Britain Institute, a public park of seventy-four acres, and manufactures of iron and brass goods, artistic bronze, joiners' tools, house trimmings, builders' hardware, cutlery, hosiery, and brick. Pop. (census of 1910) 43,916.

New Brunswick, province of the Dominion of Canada, formerly a part of Nova Scotia; bounded N. by Province of Quebec and Bay of Chaleurs, E. by Gulf of St. Lawrence and Northumberland Strait, S. by Bay of Fundy and part of Nova Scotia, W. by State of Maine; area, 27,985 sq. m.; pop. (1911) 351,889; capital, Fredericton; largest city, St. John. The physical features of New Brunswick are a reflection of its geological history. All the geological deposits of greater age than the Carboniferous form a *massif*, or "complex," diversified in places by ridges of intrusive granite. The highest hills are in the main granitic belts. Bald Mountain, in the Nerepis Hills, is 1,400 ft. high, and the Sagamore Mountain, in the Nepisiguit Hills, is 2,240 ft. The largest lake is Grand Lake, 30 m. long, but the lower reaches of the St. John River present several lakelike expansions, as Washademoak Lake and Belle Isle and Kennebecasis bays. The chief rivers are the St. John, over 440 m. long; Miramichi, Restigouche, and Nepisiguit, the first discharging its waters into the Bay of Fundy, the others emptying into the Gulf of St. Lawrence. The St. Croix and the Petitcodiac are also rivers of some importance entering the Bay of Fundy. The principal indentations of the E. coast are Chaleur, Miramichi, and Verte bays. The province is divided from Prince Edward Island on this coast by the Strait of Northumberland, and from Nova Scotia by the Bay of Fundy. This bay has two indentations of its N. shore, Passamaquoddy at one end, and Chignecto Bay at the other. The province has over 500 m. of sea coast. The climate has some unusual

contrasts. The W. part of the central plain has a high summer temperature, and the mercury sometimes rises to 95° and 100° in the shade. On the other hand, many of the plants of Labrador are found growing on the islands and points of the S. shore that jut out into the Bay of Fundy. The hottest months of the year are those in which fogs are most prevalent along the coast.

Coal is found in many places, the most important seams being at Grand Lake; excellent freestone quarries are worked in Albert, Westmoreland, Northumberland, and Gloucester cos.; good roofing slates are obtained in Charlotte Co.; lime is calcined at St. John, where there are large deposits of limestone; manganese mines are operated in Albert and King's cos.; plumbago, copper, antimony, bismuth, and lead occur; gold has been found in small quantities, and iron ore of several kinds is known to occur in considerable quantities. Value of all mineral products (1901), \$650,679. The best soils are found in connection with calcareous slates of Silurian age, as in Carleton, Victoria, Restigouche, and Queen's cos.; or with the red sandstones of Carboniferous age, as in the valleys of King's, Albert, and Westmoreland; or on the flood plains of the great rivers, as the St. John, Miramichi, and Restigouche. A great impetus has been given to dairying and cheese making, both federal and provincial governments aiding the farmers in these directions. The chief agricultural products are wheat, buckwheat, oats, rye, hay, potatoes, and other root crops. Value of farm property (1901), \$51,338,311; crops, \$12,894,076; value of forest products, \$2,998,038; value of fisheries (1909), \$4,676,315. In the census year (1905) there were 628 manufacturing plants, operated on a capital of \$26,792,698, and yielding products valued at \$22,133,951, largely cotton and woolen goods, iron and steel in various shapes, sugar, wood pulp, nails, furniture, carriages and wagons, boots and shoes, and electrical supplies.

The province is divided into thirteen counties; executive authority vested in a lieutenant governor, appointed by the Governor General of Canada for five years, and an executive council of seven members; legislative in an assembly of forty-six members; judicial in a supreme court, county courts, parish-court commissioners, and justices of the peace. The public-school system is free and nonsectarian, under control of the provincial government, and liberally supported; public, high, and superior schools (1907), 1,825; teachers, 1,974; pupils, 68,919; government expenditures, \$164,980. Institutions for higher education include Univ. of New Brunswick, Fredericton; Univ. of Mt. Allison, Sackville; St. Joseph's College, Memramcook; Methodist Ladies' College and Boys' Academy, Sackville; Baptist Coeducational Seminary, St. Martins, and Roman Catholic convent schools at St. John and elsewhere. According to the 1901 census there were 1,043 churches, with 137,378 communicants, the leading denominations numerically being the Roman Catholic, Baptist, Methodist, Presbyterian, and Anglican. Charitable institutions include a Provincial Asylum for the Insane, General Public Hospi-

tal, Protestant and Roman Catholic orphanages, Wiggins Orphan Asylum for sons of deceased mariners, Reformatory for Boys, and Home for Aged Women—all in St. John; Victoria Hospital, Fredericton; Lazaretto for Lepers, Tracadie; and a penitentiary for the maritime provinces, Dorchester. The early history of New Brunswick is bound up in that of Nova Scotia, of which it was formerly a part. A colony from New England settled at Mauderville, on the St. John River, 1761, and a larger one from Massachusetts founded the city of St. John, 1783. It was made a separate province, 1784, and became a part of the Dominion, 1867.

New Brunswick, capital of Middlesex Co., N. J.; on the Raritan River and Delaware and Raritan Canal; 26 m. NE. of Trenton; settled, 1681, as Prigmore's Swamp; received present name, 1714; royal charter, 1730; incorporated as town, 1736; as city, 1784; is the seat of Rutgers College (Reformed), with which is incorporated the State Agricultural and Mechanical College of the Theological Seminary of the Reformed Church, Rutgers Preparatory School, Young Ladies' Seminary, Wells Memorial Hospital, and a model farm and observatory belonging to the college. Its industries include the manufacture of wall paper, rubber goods, printing presses, boots and shoes, lamps and bronze work, medical supplies, machinery, hosiery, and buttons. Pop. (1910) 23,388.

Newburg, one of the capitals of Orange Co., N. Y.; on the Hudson River; 60 m. N. of New York City; is in an agricultural region; has an elevated site, and possesses much historical interest. The old Hasbrouck House was occupied by Washington during a part of the Revolutionary War, and his proclamation disbanding the American army was promulgated there. The building contains many relics of Revolutionary days, and with the grounds is carefully preserved. Near the building is a stone monument, erected by the Federal and state governments to commemorate the successful close of the war. The city has regular steamboat connection with New York and the principal cities on the Hudson, and manufactures of agricultural implements, oilcloth, cotton and woolen goods, carpets, paper, shoes, and carriages. Pop. (1910) 27,806.

Newburgh Address'es, series of anonymous letters, ascribed to Gen. John Armstrong, and circulated in the Continental army in camp at Newburgh-on-the-Hudson after the close of the Revolutionary War. The letters urged the army not to disband until the pay due to it had been provided for by Congress, and other wrongs corrected. Through the influence of Washington the threat to appeal "from the justice to the fears of the government" was not carried out, and Congress made provision for the settling of claims for pay.

Newburyport, one of the capitals of Essex Co., Mass.; on the Merrimac River, 36 m. NE. of Boston; contains the Putnam Free School, Anna Jaques Hospital, Y. M. C. A. Memorial Building, Old Ladies' Home, Marine Museum, Old South Church (burial place of George

Whitefield), and birthplace of William Lloyd Garrison; industries include shipbuilding and the manufacture of cotton goods, boots and shoes, fiberloid, carriages, silverware, hats, pumps, steam engines, and combs. Pop. (1910) 14,949.

New Caledonia, island in the S. Pacific; 800 m. E. of Queensland; between New Guinea and New Zealand; was discovered by Cook, 1774, and annexed by France, 1853. It is 250 m. long, with a greatest breadth of 30 m., and extends NW. and SE. Along its axis run a series of mountain masses, of which the culminating points reach 5,600 ft. The soil is fertile, climate excellent, and plants of the tropics and temperate zone can be raised. There are many nickel mines; gold was formerly worked; iron ore is abundant, and valuable deposits of copper, mercury, tin, and platinum are known to exist. Chief port and capital, Noumea. With its dependencies, including the Loyalty Islands, 60 m. E., New Caledonia forms a convict colony. Pop. (1907) 55,800.

New Castle. See CASTLE, NEW.

Newcastle, Thomas Pelham Holles (Duke of), 1693-1768; Prime Minister of Great Britain; son of the first Lord Pelham, to whose peerage and estates he succeeded, 1712, becoming one of the wealthiest landowners in England. All the weight of his influence was thrown on the Whig side, and his services to the house of Hanover won him the gratitude of the king. He was made Earl of Clare, 1714; Duke of Newcastle, 1715, and, 1724, became Secretary of State in Walpole's ministry. His abilities are represented as of a mean order, but he held this office for thirty years; then became Prime Minister, succeeding his brother, Henry Pelham, in that office, 1754. He resigned in 1766; recalled in following year to form the ministry rendered brilliant by the genius of Pitt; resigned, 1762.

Newcastle, town of New South Wales; 80 m. NNE. of Sydney; at mouth of Hunter River; is center of the coal industry of Australia; has also a large commerce in cereals. Pop. (1901) 54,991.

New Castle, capital of Lawrence Co., Pa.; at confluence of Shenango and Neshannock rivers, forming Beaver River; 52 m. NW. of Pittsburgh; is in a bituminous coal, limestone, fire-clay, iron-ore, and sandstone region, and has numerous blast furnaces and mills, machine shops, wire-rod mill, steel-billet mill, large wire-nail mill, tin-plate mill, asphalt-block works, stove works, glass factories, grist and planing mills, several foundries, and a paper mill. Pop. (1910) 36,280.

Newcastle-upon-Tyne, city in Northumberland, England; on the Tyne, 8 m. from its mouth; 60 m. NE. of Liverpool; is mostly built on three steep hills, on the site of an old Roman camp. It presents a striking appearance, owing to the contrasts of antiquated and modern buildings. Among the former are several towers belonging to the old walls, the keep and chapel of the old castle, and the Black

Gate. The Church of St. Nicholas (1359-1435), now the cathedral, was built on the site of an earlier structure, destroyed by fire, 1216, of which a few remains still exist. St. John's Church, built in the reign of Henry I, contains much original Norman work, with later additions. St. Andrew's Church, dating from the twelfth century, is built in the Transition style. Other notable buildings are the Guild Hall, Exchange, Moot Hall, Central News Room and Art Gallery, Museum of the Natural History Society, Public Library, College of Science and College of Medicine (affiliated to the Univ. of Durham), and Rutherford College. There are several public parks, including the Town Moor, 987 acres; Leazes Ornamental Park, Brandling Park, Armstrong Park, and Jesmond Dene. The Tyne is crossed by three bridges. The High Level Bridge, built by Stephenson, contains a carriage way 90 ft. above high water, and a railway at a height of 118 ft. above high water. The port of Newcastle is the fourth in importance in the United Kingdom. The Tyne is navigable for large vessels as far as Elswick, on the outskirts of Newcastle, where the engineering and ordnance works of Sir W. G. Armstrong, Mitchell & Co. are situated. The principal article of trade is coal. Pop. (1911) 266,671.

Newchwang, or Niuchwang, treaty port of China; province of Shen-king, Manchuria; on the Liao River, 30 m. above its mouth in Gulf of Liao-tung; 75 m. SSW. of Mukden. The first name is applied to the old town, entirely unsuitable for foreign trade; the second name is the diplomatic appellation of the port, locally Ying-tze, nearer the mouth of the river. The port was opened to foreign trade, 1861; captured by the Japanese, 1895; occupied and strengthened by the Russians in the early part of the war with Japan (1904), and attacked and captured by the Japanese two months later. Pop. (1907) 74,000.

Newcomb, Simon, 1835-1909; American astronomer; b. Wallace, Nova Scotia; removed to the U. S. in boyhood; 1857, was employed as a computer on *The Nautical Almanac*; in following year first gave special attention to theoretical astronomy; appointed, 1861, Prof. of Mathematics in the navy, and stationed at the Naval Observatory, for which he supervised the construction and erection of the great telescope; secretary of the commission for observation of transit of Venus, 1874, and took part in organizing expeditions to remote quarters of the earth on that occasion; superintendent of *The Nautical Almanac*, 1877-99; Prof. of Mathematics and Astronomy in Johns Hopkins, 1884-93. He was awarded gold medal of Royal Astronomical Society of England for his tables of Uranus and Neptune, 1874; Huyghens medal of Dutch Society of Sciences, 1878; Copley medal of Royal Society of London, 1890. Besides numerous astronomical investigations, he wrote many mathematical text-books and several works on economic subjects, and was one of the associate editors of "The Universal Cyclopaedia."

Newcomen, Thomas, d. 1729; inventor of the modern form of steam engine; b. Devon-

shire, England; was a backsmith; became interested in the applications of steam, and, 1706, patented a fire engine. The engines of the Marquis of Worcester, Savery, and all their predecessors were more or less reproductions of the old steam fountain of Hero (120 B.C.); but Newcomen made an entirely new departure, and constructed, 1706, the first real steam engine, consisting of a train of mechanism in which the steam motor was at the one end, and the pump to which its work was applied was at the other, the intermediate parts being the simplest possible and giving direct connection between the driving and the driven parts.

New England, collectively, the states of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut. The territory comprised in these states was originally called N. Virginia, when granted, 1606, by James I to the Plymouth Company for colonization, but received its present name from Capt. John Smith, who explored it, 1614, and made a map of the coast. The first white settlers were chiefly natives of England. See the articles on the individual states.

Newfoundland, island and British colony in N. America, lying across the entrance of the Gulf of St. Lawrence; greatest length from Cape Ray to Cape Norman, 317 m.; greatest breadth from Cape Spear to Cape Anguille, 316 m.; total area, 42,734 sq. m.; pop. (1907) estimated at 230,139; of Labrador, 4,024; capital, St. John's; other towns: Harbour Grace, Carbonear, Twillingate, Bonavista. It is that part of the continent of N. America which lies nearest to Europe, the distance between the extreme E. part of Newfoundland and Valentia, Ireland, being 1,640 m. By the great bays of Trinity and Placentia it is almost severed into two portions, the S. being the peninsula of Avalon, on which St. John's is situated. The Avalon peninsula is further divided by the bays of St. Mary and Conception. Within a degree of the E. coast is the Great Bank of Newfoundland—the greatest submarine island of the globe, 600 m. in length and 200 in breadth—the chief breeding ground of the cod. The whole Atlantic coast of Labrador, 1,100 m. in extent, with its valuable fisheries, is also attached to Newfoundland, and under the jurisdiction of the colony. The climate is variable, but as a whole favorable to health. In winter the thermometer seldom sinks more than a few degrees below zero; summer range of thermometer from 70° to 80°; average mean temperature, 41°–42°; average rainfall, 58.30 in.

Along the coasts are miles on miles of rocky walls from 200 to 300 ft. in height, bold promontories and headlands, but within many of the bays are scenes of rare beauty. The center of the island consists of an elevated, undulating plateau, traversed here and there by ranges of low hills. The principal of these is the Long Range, which extends along the E. side of the island for nearly its entire length, having peaks more than 2,000 ft. in height. Parallel to this is the Anguille Range. The Middle Range stretches across the country from Fortune Bay to Notre Dame Bay. The

largest bay is Placentia, 55 m. wide at the entrance, and 90 m. in length, containing numerous islands. Fortune Bay is 25 m. wide and 70 in length. At its mouth are the islands of St. Pierre and Miquelon. Bay St. George, on the W. coast, is 40 m. wide, with a good harbor at its head. Notre Dame Bay, on the N. coast, is 50 m. wide at its mouth, and penetrates more than 80 m. inland. Trinity Bay runs 70 m. inland. On the S. side of the bay is Heart's Content, where the Atlantic cables are landed. Conception Bay is the most populous and commercially important. The three largest rivers are the Exploits, Humber, and Gander. Lakes and ponds cover nearly a third of the entire surface. The largest is Grand Lake, 56 m. in length, with an area of 192 sq. m., inclosing an island 22 m. long and 5 m. in breadth.

The fisheries constitute the great staple industry. The most important is the cod fishery, which is prosecuted around the shores of the island, along the coast of Labrador, and to a limited extent on the Banks. The average annual value of this fishery exceeds \$6,000,000. The seal fishery is next in value. The chief seats of the herring fishery are Labrador, Bonne Bay, Bay of Islands, St. George's Bay, and Fortune Bay. The salmon and lobster fisheries are also important. There are close on 5,000,000 acres fit for agricultural and grazing purposes, of which over 85,500 acres are cultivated land, yielding potatoes, turnips, other root crops, hay, barley, and oats. Copper mines are worked on shore of Notre Dame Bay, at Betts Cove, and Little Bay; lead and silver have been found at Port-a-Port and on shores of Placentia Bay; gold-bearing quartz in E. part of island; gypsum and marble on W. coast; coal near St. George's Bay and in Grand Lake district.

The government is vested in a governor, appointed by the crown, assisted by an executive council (not exceeding nine members), a legislative council (not exceeding eighteen members), and a house of assembly of thirty-six representatives. For electoral purposes the colony is divided into eighteen districts. Representative institutions were granted, 1832; responsible government, 1855. The leading religious denominations are the Roman Catholic, Anglican, Methodist, and Presbyterian. The system of education is the denominational one. The legislature each year appropriates from the general revenue a certain amount for educational purposes. There are three superintendents of schools, one representing the Church of England, one the Roman Catholic Church, and one the Methodist Church. There are three colleges—Church of England, Roman Catholic, and Methodist, a Presbyterian academy, and several grammar schools. In 1907 there were 635 m. of government railway and 21 m. of private line, 3,088 m. of telegraph, 350 m. of telephone, and a fleet of eight steamers plying between the island and the continent.

Newfoundland was discovered, 1497, by John Cabot, although five hundred years before, according to Icelandic sagas, it was visited by Lief, son of Eric the Red. The value of its

fisheries was soon afterwards made known, and fishermen from Normandy, Brittany, and the Basque provinces were attracted to its encompassing seas. It was not till 1583 that formal possession of the island was taken by Sir Humphrey Gilbert, in the name of Queen Elizabeth. The French long disputed with Great Britain for the possession of Newfoundland, but the contest was ended, 1713, by the Treaty of Utrecht, which ceded the island to England, but secured to the French the right of fishing and curing fish on the N. coast from Pointe Riche to Cape Bonavista; the limits were afterwards (1783) changed to Cape Ray and Cape St. John. This concession to the French led to continual disputes and bitter animosities till 1904, when an Anglo-French convention was signed by which France renounced her exclusive fishing rights, under the Treaty of Utrecht, on the N., or French, shore, but retained the right to fish between St. John's Cape and Cape Ray. A long-pending controversy between the American and Newfoundland authorities, concerning the rights of New England fishermen in Newfoundland waters, was kept from serious consequences by a *modus vivendi*, several times renewed, pending a determination of American rights by The Hague Tribunal of the seven points at issue. The Tribunal, 1910, decided the two most important in favor of Great Britain.

Newgate, former prison in London; at the W. end of Newgate Street, opposite the Old Bailey; mentioned as a prison, 1207; was at the new gate of the city. In the fifteenth century Sir Richard Whittington in his will left funds to rebuild it; in 1666 it was again rebuilt after the great fire; last edifice erected, 1780, but was greatly damaged by a fire in the No-popery riots of that year. In 1808 Mrs. Fry began her labors for the improvement of the horrible condition which had for centuries characterized the place. Debtors were not there after 1815, and the institution gradually became, in many respects, a model one of its kind; demolished, 1902.

New Grana'da. See COLOMBIA.

New Guinea (gin'ē), or Pa'pua, largest known island except Greenland, lies just N. of Australia; estimated area, 312,000 sq. m.; pop. abt. 750,000; has been divided by treaty between the Netherlands, Germany, and Great Britain, the former governing nearly one half of the total area, comprising all of the island W. of the 141st meridian, called DUTCH NEW GUINEA, 151,789 sq. m.; BRITISH NEW GUINEA (founded 1888) comprising the S. part and the neighboring islands, 90,540 sq. m.; GERMAN NEW GUINEA, or KAISER WILHELM'S LAND (protectorate after 1884) comprising all of the N. part of SE. New Guinea, 70,000 sq. m.; with adjacent islands, 95,160 sq. m. Most of the N. and SE. coasts, high and mountainous; Mt. Owen Stanley, in the SE., about 13,200 ft. high; abutting on the SW. coast are the Charles Louis Mountains; island is surrounded by many large and small islands; coasts indented by deep bays, but few afford first-rate harbors; largest rivers, the Fly, emptying into the Gulf of Papua, and Kaiserin Augusta, which takes

a course through the German possessions. Gold is found in the Bismarck Mountains; the raising of cotton, rubber, rice, coffee, sugar cane, tobacco, vanilla, and cocoanut palms is a flourishing industry; horses and cattle flourish in some districts. Inhabitants are chiefly Papuan. Chief settlement of British New Guinea, Port Moresby, on the Gulf of Papua; seat of government of Kaiser Wilhelm's Land, Stephansort. Dutch New Guinea, for governmental purposes, is attached to the residency of Ternate, Molucca Islands; principal port of call, Dorey, on the N. coast. On September 1, 1906, a proclamation was issued by the Governor General of Australia declaring that British New Guinea is to be known henceforth as the Territory of Papua.

New Hamp'shire (named from Hampshire, England), popular name, GRANITE STATE; state in the N. Atlantic division of the American union; bounded N. by province of Quebec, E. by Maine and the Atlantic Ocean, SSE. and S. by Massachusetts; extreme length N. and S., 178 m.; extreme width, 100 m.; area, 9,341 sq. m.; pop. (1910) estimated at 430,572; principal cities and towns, Manchester, Nashua, Concord (capital), Dover, Portsmouth, Keene, Berlin, Rochester, Laconia, Somersworth, Claremont, Franklin, Exeter. Surface, except in the SE., generally hilly or mountainous. The White Mountain district, containing the White and Franconia ranges, exceeds 2,000 ft. in height and has twenty-nine peaks over 4,000 ft. in



height, headed by Mt. Washington, 6,286 ft. Monadnock, an isolated peak in the extreme SE., is 3,186 ft. Seacoast, only 18 m. in extent, has but one good harbor. Chief rivers, the Connecticut, separating New Hampshire from Vermont; Piscataqua, only navigable stream; Merrimac, noted for the manufacturing cities on its banks; Androscoggin, Saco, upper and lower Ammonoosuc, Cochecho, Pemigasset, and Winnipisogee; lakes, very numerous and beautiful, especially Winnipisogee (19 m. long), Umbagog, Squam, and Sunapee; islands, but three in number, belonging to the Isles of Shoals group. The climate cold but healthful, the winters being severe and the summers mild and agreeable; mean annual temperature for the part N. of the White Mountains and on the W. as far S. as Hanover, 41°, that of the S. part 45°.

Mineral productions include granite, mica, brick clays, slate, limestone, iron ore, colored porphyries, quartz and feldspar for glass, plumbago, ochers, whetstones, soapstone, and precious stones, including the beryl; ores of gold, silver, copper, tin, lead, iron, etc., found, but in small quantities; value products (1910), \$2,146,736; of granite output (1910), \$1,239,656; of clay products, \$566,126. Soil in the main stony and unfertile; light and sandy in the S.; well adapted to farming in much of the Connecticut valley and in Coos Co.; production of principal crops, 1911: Corn, 1,035,000 bu; oats, 406,000 bu.; barley, 24,000 bu.; buckwheat, 27,000 bu.; potatoes, 2,125,000 bu.; hay, 672,000 tons; tobacco, 170,000 lb.; total value of crops, \$14,574,200; chief fruit crop, apples; total value of live stock (1911), \$12,206,000. Chief manufactures, cotton and woolen goods, paper, boots and shoes, lumber and lumber products, quarry products; "factory-system" plants (1909), 1,961; capital employed, \$139,990,000; value products, including custom work and repairing, \$164,581,000. Noteworthy educational institutions include Dartmouth College, State College of Agriculture and Mechanical Arts, Durham; State Normal School, Plymouth; St. Anselm's College (Roman Catholic), Manchester; State Industrial School, Manchester. There are training schools for nurses (ten) in hospitals in Concord, Hanover, Keene, Laconia, Manchester, Nashua, Whitefield, and Woodsville, and twenty-nine high-grade academies and seminaries (about one half nonsectarian).

New Hampshire was first visited by Europeans, 1614, and the first settlements were made at Dover and Portsmouth, 1623. In 1641 the district was annexed to Massachusetts; was made a royal province, 1679, but was again joined to Massachusetts, 1689. In 1741 it became a separate province, and remained so till the Revolution. Its claim to the territory now included in Vermont led to a vexatious controversy. In 1776 New Hampshire made a public declaration of independence, and established a temporary government to continue during the war, in which the state took an active part. On June 21, 1788, the Constitution of the United States was ratified. The state constitution went into effect, 1784; was revised, 1791; has since continued the supreme law. In 1807 the seat of government was permanently established at Concord.

New Harmony, town in Posey Co., Ind.; on the Wabash River; 26 m. NW. of Evansville; settled by the Harmonists (*q.v.*), under George Rapp, 1815; transferred to Robert Owen for an experiment in socialism, 1824; seat of an industrial school later founded by William Maclure; has saw, planing, and flour mills. Pop. (1910) 1,229.

New Ha'ven, popularly called the **ELM CITY**, capital of New Haven Co., Conn.; on New Haven Bay, 36 m. WSW. of Hartford. In the center of the city is a square, known as The Green, which contains three churches, the oldest in New Haven, and trees of great size and beauty. NE. of the city is an eminence, East Rock, 360 ft. in height, which is a public park, and has a soldiers' monument on the sum-

mit; W. of the city is West Rock, 420 ft. in height, also a park, and containing "Judges' Cave," a pile of boulders in which the regicides Goffe and Whalley for a time concealed themselves. New Haven is the seat of Yale Univ., founded 1701; Hopkins Grammar School, founded 1660; Manual and Normal Training schools, School for Nurses, Protestant and Roman Catholic orphan asylums, Home for Aged Women, Home for the Friendless, Springdale Almshouse, Hillhouse High School, and several hospitals, seminaries, and academies. It is a notable manufacturing center, especially of carriages, rifles, clocks, hardware, iron and edge tools, wire goods, rubber goods, pulp and paper, musical instruments, and corsets, the capital employed (1909) being over \$52,000,000 and value of products \$51,000,000.

The site of New Haven was visited by the Dutch navigator Block, 1614, and named Roodenberg, from the appearance of East and West rocks. In 1637 Theophilus Eaton, a London merchant, and a few associates settled here, and, 1638, were joined by Puritan families, led by Rev. John Davenport. Quinnipiack, as the Indians called it, soon took its present name. With other towns on the Sound, and a few on the N. shore of Long Island, it formed a distinct colony; acknowledging allegiance to neither king nor government; accepting the Scriptures as containing the only proper rule for the government of both Church and State. Under this theocracy the people lived in simplicity and independence, until a liberal charter, procured by Connecticut from Charles II, 1662, included them within its jurisdiction. By this charter, to which New Haven after much ill feeling submitted, New Haven and Hartford were made joint capitals of Connecticut. In 1873 Hartford was made the sole seat of government. Pop. (1910) 133,605.

New Heb'rides, chain of islands in the Pacific, W. of the Fiji Islands; extending a distance of over 500 m.; area, about 5,100 sq. m.; under a mixed commission of English and French naval officers; largest islands, Espiritu Santo, Mallicolo, Api or Tasiko, Efate or Sandwich, Eromanga, Aipepe or Tanna, Futuna or Erronan, and Aneityum; all are densely wooded, and the breadfruit, sago palm, banana, sugar cane, coffee, yam, arrowroot, orange, and pineapple flourish; trade mostly with Sydney and New Caledonia. There are Roman Catholic and Presbyterian missions and several English and French trading companies. Pop. abt. 50,000.

New Hol'land. See AUSTRALIA.

New Ire'land. See NEW MECKLENBURG.

New Jer'sey (named from the island of Jersey, in the English Channel), state in the N. Atlantic division of the American union; bounded N. by New York, E. by the Hudson River, Staten Island Sound, Raritan Bay, and the Atlantic; S. by Delaware Bay, W. by the Delaware River, which separates it from Delaware and Pennsylvania; extreme length, 167½ m.; greatest breadth, 59 m.; area, 8,224.44 sq. m.; pop. (census of 1910) 2,537,167; principal cities and towns, Newark, Jersey City, Pat-

erson, Camden, Trenton (capital), Hoboken, Elizabeth, Bayonne, Atlantic City, Passaic, Orange, W. Hoboken, E. Orange, New Brunswick, Perth Amboy, Plainfield, Union, Montclair, Bridgeton, Morristown, Kearny, Harrison, Millville, Phillipsburg. The N. part of the state is traversed by three mountain ranges—the Blue Mountains, or Blue Ridge, called also Kittatinny, which crosses the Delaware River at the Water Gap, where its summit is 1,479 ft. above the sea, and runs NE. to New York State, where it becomes the Shawangunk range; the Highland range, of numerous disconnected ridges, occupying a belt 22 m. wide on the New



York State line and 10 m. on the Delaware; and a range consisting of ridges of trap rock, which diversify the red sandstone belt, a strip averaging 20 m. in width and crossing the state from NE. to SW. Among the ridges of this third range are the First, a part of which is better known as Orange Mountain, 534 ft. high at Garret Rock, near Paterson, and the Palisades, which wall in the Hudson on the W. from the New York State line nearly to Jersey City.

In the S. are a few rounded hills. The Navesink Highlands, S. of Sandy Hook, reach a height of about 400 ft. S. New Jersey is a gently undulating plain, from 150 to 190 ft. in elevation in the center, and sloping gradually to the Atlantic on the E. and the Delaware River or Bay on the W. Principal rivers, Passaic and Hackensack, which flow into Newark Bay; Ramapo, Wanaque, and Pequannock, whose union forms the Pompton, and the Rockaway, all affluents of the Passaic; Raritan, received by Raritan Bay; Elizabeth and Rahway, which empty into Staten Island Sound; Navesink, Shrewsbury, Shark, Manasquan, Metedeconk, Tom's, Little Egg harbor or Mullicas, Great Egg harbor, and Cedar Creek, which flow into the Atlantic or into bays communicating directly with the sea. Delaware Bay receives the Delaware River, with its fifteen tributaries, and in the extreme S. of the state Cohansey Creek and Maurice River, as well as a number of smaller streams. The tidal bays along the coast, sometimes called harbors or sounds, form a line of internal water communication from the Metedeconk River to Cape May for vessels of light draught. The principal ones are Barnegat Bay, Little Egg harbor, Great Bay, Absecom Bay, and Great Egg harbor.

In the N. part of the state are many mountain lakes and ponds, remarkable for purity of water. Lake Hopatcong, the largest body of fresh water in the state, is 914 ft. above mean tide, $5\frac{1}{2}$ miles long, and from $\frac{1}{2}$ to $1\frac{1}{2}$ m. in width. Average temperature in January 25.7° , precipitation 2.38; in August, 72° , precipitation 5.64; average temperature for year 51.4° , precipitation 47.4.

The soil is a sandy loam, easily tilled, and lighter in the S. than in the middle and N. parts. Production of principal farm crops, 1911: Corn, 9,936,000 bu.; wheat, 1,462,000 bu.; oats, 2,024,000; rye, buckwheat, potatoes, and hay. Dairying is a prominent industry, the raising of flowers, vegetables, apples, pears, peaches, grapes, and vegetables for the New York and Philadelphia markets is extensively carried on, and much attention is paid to seed farms and nurseries. Mineral products include iron ore, zinc ore, granite, slate, gneiss, blue and white limestone, roofing and writing slates, flag and paving stones, graphite, porcelain and pottery clays, infusorial earth, used for polishing and in the preparation of giant powder; molding sand and sand for making brick for reverberating furnaces, green sand for chemical purposes and glass making, iron pyrites, sulphate of baryta, manganese, molybdenum. The trap ridges supply the best of road material; value mineral products (1910), \$30,888,892, including pig iron, \$4,204,722, and clay products, \$17,834,309.

New Jersey ranks sixth in the U. S. in value of manufactured products. "Factory-system" plants (1909), 8,817; capital employed \$977,172,000; value products, \$1,145,529,000. Products include silk and silk goods, cotton thread, textiles, carpets, rubber goods, leather and leather goods, iron and steel, hardware, locomotives, cars, sewing machines, electrical supplies, trunks, boots and shoes, chemicals, celluloid, varnishes, paints, glass, pottery, jewelry, malted liquors, and tobacco. Newark, Paterson, Trenton, and Hoboken are prominent centers. Bayonne has large petroleum refineries, and at Elizabethport and on the Delaware River are large shipyards. The fisheries of the state are varied and very profitable. Principal educational institutions: Princeton Univ., Princeton; Rutgers College, New Brunswick; New Jersey College of Agriculture, connected with Rutgers College; State Normal School, Trenton; Burlington College (Protestant Episcopal), Burlington; Seton Hall College (Roman Catholic), S. Orange; Stevens Institute of Technology, Hoboken; theological seminary (Presbyterian), Princeton; Drew Theological Seminary (Methodist Episcopal), Madison; German Theological Seminary (Presbyterian), Bloomfield.

The earliest white settlers of New Jersey were the Dutch, who, 1614-21, founded the colony of New Netherlands on the territory between the Hudson and Delaware rivers. In 1664 this region passed to the English, and the Duke of York, who held a grant from the king, made it over to John, Lord Berkeley, and Sir George Carteret. The province was named in honor of Carteret, who had been governor of the island of Jersey. The proprietors established a government, which continued until 1676, when the

province was divided into E. Jersey and W. Jersey by a line drawn from Little Egg harbor to a point on the Delaware to latitude 41° 40' N. The two divisions remained distinct until 1702, when the proprietors surrendered their powers of government to the crown, reserving their exclusive right to dispose of the soil. Thereafter, until the Revolution, New Jersey was a royal province. In 1703-38 the provinces of New York and New Jersey had the same governors. On July 2, 1776, two days before the Declaration of Independence, the Provincial Congress adopted a constitution for an independent state, and under this the state was governed till 1844. New Jersey was fighting ground during most of the Revolution. The important battles of Trenton, Princeton, and Monmouth, with other minor engagements, were fought within her borders. The Federal Constitution was ratified by the state December 18, 1787. The state constitution of 1776 allowed universal suffrage, both male and female, white and colored, subject to a property qualification of £50. Women continued to vote till 1807.

New Jersey Tea, small shrub (*Ceanothus americanus*) of the Buckthorn family, whose leaves were used as a substitute for tea during



NEW JERSEY TEA.

the American Revolution. The other species of the genus *Ceanothus* are abundant in W. and SW. U. S.

New Jerusalem, Church of the, name taken by a body of Christian worshippers, who accept as true the doctrines taught in the theological writings of Emanuel Swedenborg. In 1787 the first organization was formed in London; two years later a general conference was held, also in London; 1821, a legal body was formed under the title, The General Conference of the Ministers and other Members of the New Church, signified by the New Jerusalem in the Apocalypse or Revelation of John. This Church has flourished principally in England, the U. S., and Canada, though a few scattered societies are to be found on the continent of Europe. The first regular society in the U. S., with a minister at its head, was formed in Baltimore, Md., 1792. In 1817 the body now known as

The General Convention of the New Jerusalem in the U. S. of America was organized in Philadelphia. This body was incorporated, 1861; under the laws of the State of Illinois, and includes the larger part of those in the U. S. and Canada who openly accept the doctrines of the New Church. In the U. S., 1906, there were 128 ministers, 139 churches, and 8,084 communicants; in Great Britain and Ireland, 79 societies with 8,737 registered members; in Canada, 4 churches with some 300 communicants. The cardinal doctrines of the Church are that Christ, in His glorified humanity, is the only God of heaven and earth, and that in Him is the Trinity, answering to the trinity in men of soul, body, and their operation together; and that to be saved it is necessary to believe in Him, and to keep the Commandments by shunning the evils therein forbidden, as sins against Him. There is no authoritative liturgy or discipline, but a "Book of Worship" is in general use, containing a variety of forms, nearly all taken directly from the Bible.

New Leon'. See NUEVO LEON.

New Light and Old Light, terms used for the two parties in the Associate Synods of Scotland, abt. 1800, and used later for the two parties in the Reformed Presbyterian Church in the U. S.

New London, one of the capitals of New London Co., Conn.; on the Thames River; 40 m. SE. of Hartford; founded, 1646; name changed from Naumeg, 1658; plundered and burned by the British, 1781; chartered as a city, 1784; has an excellent harbor, defended at its entrance by Forts Trumbull and Griswold; contains the Bulkely School for Boys, Williams Memorial Institute for Girls, County Historical Society Library, U. S. Naval Station, Haven Public Library, hospital, and a shaft 127 ft. high at Fort Griswold commemorating massacre of 1781. It has several shipyards, extensive silk mills, iron foundries, woolen mill, cotton-gin factory, large sawmill, printing-press manufactory, and minor industries. The river here is a favorite racing course for college rowing clubs. Pop. (census of 1910) 19,659.

Newman, Francis William, 1805-97; English author; b. London; brother of Cardinal Newman; Classical Prof. in Manchester New College, 1840-46, and University College, London, 1846-63. On theological subjects his views were exactly contrary to his brother's. His works include "Catholic Union: Essays toward a Church of the Future and the Organization of Philanthropy," "A History of the Hebrew Monarchy," "Contrasts of Ancient and Modern History," "Phases of Faith," "Lectures on Political Economy," "Theism," "The English and Their Reforms," "Early History of Cardinal Newman," and numerous translations and philological works.

Newman, John Henry, 1801-90; English religious leader; b. London; educated at Trinity College, Oxford; took Anglican orders, 1824; associated with Keble and Pusey in originat-

ing the "Oxford movement"; was a leader in the propaganda of High Church doctrines by means of the celebrated "Tracts for the Times." In 1845 he joined the Roman Catholic Church, and, 1849, established a branch of the brotherhood of St. Philip Neri at Edgbaston, where he took up his residence. He delivered lectures on "Anglican Difficulties," 1850, and on "Catholicism in England," 1851; was created cardinal, 1879. He wrote a number of the "Tracts for the Times," including the famous "Tract No. 90"; "Essays on Development of Christian Doctrine," "Arians of the Fourth Century," "Theory of Religious Belief," "Calista, a Sketch of the Third Century," "History of My Religious Opinions," "A History of Arianism," many sermons, lectures, essays, poems, including "Lead, Kindly Light," and other works.

Newmarket, town of England; partly in Cambridge Co., partly in Suffolk; 69 m. NNE. of London; is the seat of the most famous race course in England. Pop. (1901) 10,686.

New Mecklenburg, or **New Ireland**, second largest island of the Bismarck Archipelago; NE. of New Guinea; is separated from the largest, New Pomerania, by a strait so narrow that it was long undiscovered, and was later half choked by a volcanic eruption near it. It is about 200 m. long by 20 or 30 broad, and contains 4,000 sq. m.; is but little known, and attempts to colonize have been unsuccessful. It is under German protection.

New Mexico, state in the Mountain division of the United States; bounded N. by Colorado, E. by Oklahoma and Texas, S. by Texas and Mexico, W. by Arizona; length from N. to S., 345 m. on the E. side, 380 m. on the W.; breadth on the N. line, 330 m., on the S., 352 m.; area, 122,634 sq. m.; pop. (1910 census) 327,301, including 20,000 Indians; principal cities and towns, Albuquerque, Santa Fé (capital), Las Vegas, Raton, Gallup, Silver City, Roswell, Alamogordo, Socorro.

The surface is a part of the lofty table-land which is the foundation of the Rocky Mountain ranges, as well as those of the Sierra Madre, and gradually slopes S. to the Llano Estacado, or Staked Plain, and to El Paso. The Llano Estacado is a broad, almost level, treeless, and waterless plain, apparently barren, but capable under irrigation of yielding large crops. From the elevated table-land there rise hundreds of summits of the Rocky Mountains, and W. of the Rio Grande the peaks of the Sierra Madre lift themselves from 3,000 to 10,000 ft. above the *mesa* or plateau. The mountain chains E. of the Rio Grande valley are known locally as the Guadalupe, Sacramento, and Organ mountains, and still farther E. the Sierras Blanca, Hueca, Capitana, etc., which form the W. boundary of the valley of the Rio Pecos. W. of the Rio Grande the Sierra Madre is divided into numerous chains and some isolated peaks. Still farther W. the San Juan Mountains enter New Mexico from Colorado, and the heavy masses of the Mogollon Mountains and the Pinaleno, Peloncito, and Chiricahua Mountains from Arizona.

The principal river is the Rio Grande, not navigable in any part of its course through New Mexico. It receives from the W. two tributaries, the Rio Chama and the Rio Puerco, and from the E. several smaller streams. The Rio Pecos, a large affluent of the Rio Grande, drains the SE. and E. portion, and the Canadian River and two or three of its branches the NE. The W. portion is drained by the large tributaries of the Colorado River and their affluents, and particularly by the San Juan, Little Colorado, and Gila, each of which has three or four considerable tributaries. Cli-



mate dry, though varied, and noted for its healthfulness; range of temperature in the N. 10° to 75° F.; temperature in the S. rarely as low as 32°; rainy season is in July and August. The soils in the arable sections, under the influence of irrigation, are productive; principal crops, 1911: Corn, 2,322,000 bu.; spring wheat, 512,000 bu.; oats, 1,862,000 bu.; barley, 66,000 bu.; potatoes, 800,000 bu.; hay, 575,000 tons. Stock raising, especially sheep, is an important industry, the many indigenous grasses affording a valuable and natural hay; value of live stock (1911), \$43,329,000. Manufactures include flour and grist, lumber and timber products, railroad cars, brick and tile, boots and shoes, foundry and machine shop products, and wines. "Factory-system" plants (1909), 313; capital employed, \$7,743,000; value of products, \$7,898,000. The milling of metals and wool scouring are extensively carried on. Mineral products include gold, silver, copper, lead, iron, salt, bituminous and anthracite coal, gypsum, carbonate and sulphate of soda, superior clays, kaolin, alum, many kinds of precious stones, including emeralds, turquoise, garnets, opals, and agates; also petrified woods used by jewelers for inlaid work. Mineral springs are numerous. Value mineral products, 1910, \$7,704,373.

Principal educational institutions: Univ. of New Mexico (nonsectarian), Albuquerque; Agricultural College, Mesilla Park; School of Mines, Socorro; New Mexico Military Institute, Roswell; Normal School, Silver City; Normal Univ., Las Vegas; Indian Industrial School, Santa Fé; St. Michael's College (Ro-

man Catholic), Santa Fé. There are many Roman Catholic academies and schools, the Spanish-speaking citizens being mostly of that faith. The original population of New Mexico, either Aztec of Toltec, had walled towns, stone dwellings, manufactures of cotton and wool, and raised large crops by irrigation. The Spanish explorers Alvar Núñez, Marco de Niza, and Coronado penetrated to this region, 1537, 1539, and 1540. In 1581-82 the country was explored by other Spaniards, from whose account it was named New Mexico. Between 1595 and 1599 Juan de Oñate was sent thither by the Viceroy of Mexico to establish forts, colonies, and missions, and to take possession of the country in the name of the King of Spain. In 1680 the Indians rose and expelled the Spaniards; 1698, the Spaniards regained a portion of their former power; 1822, the inhabitants united with those of Mexico in throwing off the yoke of Spain; and thenceforward, until 1846, they were governed as other states of Mexico. In 1846 Gen. Stephen Kearny, with a small U. S. force, captured Santa Fé, and soon after conquered the whole territory; 1848, the region was ceded to the U. S. by the Treaty of Guadalupe Hidalgo. In 1850 New Mexico was organized as a territory. By the treaty of December 30, 1853, what was known as the Gadsden Purchase was added to the territorial area, which then comprised the whole of Arizona and a portion of what is now Colorado. Arizona was set off, 1863, and the portion of Colorado, 1865. Attempts, 1904-6, to have New Mexico and Arizona admitted into the Union as one state were successfully opposed. By an enabling act of 1910, New Mexico adopted a constitution in 1911 and was admitted to statehood, 1912.

New Netherlands, old name of the country situated between Delaware and Connecticut rivers. The exclusive right to trade here was granted, October 11, 1614, by the States-General to the explorers. In 1623 New Netherlands was made a province or county of Holland, and the States-General granted it the armorial distinction of a count. In September, 1664, the colony of New Netherlands, which Charles II had granted to his brother, the Duke of York, was conquered by the capitulation of New Amsterdam.

Newnham College, institution at Cambridge, England, formed by the amalgamation of an association for providing lectures for women in Cambridge and an association for providing a hall of residence for women attending the lectures; was incorporated, 1880; contains accommodations for about 160 students. In 1881 the Univ. of Cambridge opened to students of Newnham and Girton colleges its tripos and previous examinations. Instruction is provided for partly by lectures given at Newnham College and partly by lectures of the university and its colleges.

New Orleans, city in Orleans Parish, La.; on both banks of the Mississippi River, 107 m. from its mouth. From the fact that it was originally built within a great loop of the Mississippi, the city derived its sobriquet of the

Crescent City. The present form, due to gradual expansion along the banks of the river, is rather that of the letter S. The city embraces the whole of the parish of Orleans, or about 196 sq. m. The Mississippi in front of the city has a width in places of 3,000 ft., and a maximum depth of 208 ft.; total length of actual harbor, 7 m. on each bank. The jetties at the mouth of the river permit vessels of the highest tonnage to come directly to the city. By a canal in the rear New Orleans has communication with Lake Pontchartrain. The land is low and flat, its greatest elevation being 10 ft. 8 in. above sea level. It is protected from the waters of the river by a high levee; but during the spring floods these waters occasionally submerge portions of the city. The drainage is pumped into Bayou Bienvenue and Lake Pontchartrain; sewage is discharged into the Mississippi. As water is usually found at a depth of a few feet, burial of the dead is in most places impossible, and it is customary to place the remains in tombs of brick or marble rising in several tiers above ground.

The city is divided by Canal Street into two portions, the Creole and the American. In the Creole quarter or *Vieux Carré* the streets are narrow and the houses are welded into compact blocks, except at the lower extremity, or Esplanade Avenue. Here are the old cathedral, the Cabildo, and many other relics of French and Spanish domination. In the American quarter, besides the business portion, are residences surrounded by clustering trees, among which are the great magnolia, palmetto, palm, fruit-bearing banana, fig, and orange tree. The climate is tropical. The proximity of the lake and the river renders the atmosphere very moist and equalizes the temperature. The highest average summer temperature is 94° F., and the lowest average in winter is 27° F. Manufactures include refined sugar, cotton-seed oil and cake, milled rice, machinery, hardware, leather, boots and shoes, lumber, staves, cotton goods, beer, cigars, naval stores, ice; capital employed (1909), \$56,934,000; value of products, \$78,794,000. Trade and commerce are very large, the city being entered by a number of railroads, having steamship connection with every important port in the world, and having many miles of superior docks and piers. Exports include cotton, cotton manufactures, wheat, corn, sugar, rice, flour, live stock, beef, pork, lard, wool, hides, oils, machinery and hardware, naval stores, S. pine, tobacco, fresh fruits and vegetables, and canned goods and vegetables. Cotton exported, 1910-1, 1,460,923 bales, this being the largest cotton market in the world. Value of imports, domestic and foreign merchandise, in year ending June 30, 1911, \$66,722,295; exports, \$172,835,293; tonnage of vessels in foreign trade, entered, 2,019,067; cleared, 2,249,883. A naval station at Algiers, opposite New Orleans, has a frontage of 1,160 ft. and an area of 70 acres; here also is a U. S. floating dock which can accommodate a 15,000-ton battleship.

The city was founded, 1718, by Sieur de Bienville, second governor of Louisiana under the French domination; was named in honor of the Duke of Orleans, regent of France; and

was the capital of Louisiana, 1722-1852 and 1865-80. On the transfer of the province to Spain, 1763, the city was the scene of an unsuccessful conspiracy to establish a republic. In 1800 it again came under French rule; 1803, passed to the U. S.; 1805, incorporated as a city; 1816, unsuccessfully attacked by the British under Gen. Pakenham; 1862, occupied by the Federal troops under Gen. Benjamin F. Butler; 1884-85, held a great cotton exposition. It has been visited by many epidemics of yellow fever, but since 1895 has been almost entirely exempt. Pop. (1910) 339,075.

New Phil'ippines. See CAROLINE ISLANDS.

New Pomera'nia. See NEU POMMERN.

New'port, city of Campbell Co., Ky.; on the Ohio River, at the mouth of the Licking River; opposite Cincinnati, Ohio, and Covington, Ky., with both of which cities it is connected by railway and foot and wagon bridges. The industries include the manufacture of iron and steel, nuts and bolts, watch cases, stoves, shoes, and piping. The Highland suburbs are very picturesque, and contain the costly residences of many Cincinnati business men. Pop. (1910) 30,309.

Newport, capital of Newport Co., R. I.; formerly one of the state capitals; on Narragansett Bay; 5 m. N. of the Atlantic, 30 m. S. of Providence. It was settled by colonists from Roger Williams's party, 1638, and by Quakers, 1643; chartered with Providence and Portsmouth under the name of Providence Plantations, 1643; was one of the most important commercial points in the colonies prior to the Revolutionary War; captured by the British, December 6, 1776, and occupied till October 25, 1779; headquarters of Rochambeau's French fleet, 1780; has become one of the most popular places of summer resort in the U. S. The harbor is defended by modern fortifications at Fort Adams, Fort Greble, and Fort Wetherell, the last named on the site of the old Dumpings, where a Revolutionary fort formerly stood. The Hanging Rocks, Spouting Cave, and the chasm, 50 ft. deep, locally known as Purgatory, attract many tourists. On Coaster's Harbor Island are the U. S. Naval Training Station and Naval War College, and on Goat Island the U. S. Naval Torpedo Station. The city claims to have had the first Baptist church building erected in America, the first public school, the first synagogue, and the first newspaper.

Among the notable buildings are the Old Stone Mill, or Round Tower, in Touro Park, said by some antiquaries to have been built by the Norsemen five hundred years before the arrival of Columbus, and by others to have been the stone windmill of Gov. Benedict Arnold; Trinity Church (Protestant Episcopal), First Baptist Church, Redwood Library, State House, old City Hall, Jewish synagogue, Channing Memorial Church, new City Hall, Public Library and the Home for Friendless Children (both founded by Christopher Townsend), Rogers High School, and the Industrial School. Touro Park contains a bronze statue of Com. Matthew C. Perry and a statue of William

Ellery Channing; Washington Square, one of Com. Oliver Hazard Perry; and Equality Park, a soldiers' and sailors' monument. Pop. (1910) 27,149.

Newport News, town of Warwick Co., Va.; on the James River and Hampton Roads; 14 m. N. of Norfolk; in a rich trucking section; has one of the best harbors in the world, and is connected with Hampton and Old Point Comfort by electric railways; has an extensive shipbuilding plant, with dry docks large enough to take in the largest steamships; extensive warehouse piers and large grain elevators. Pop. (1910) 20,205.

New Providence. See BAHAMA ISLANDS.

New Red Sand'stone, geologic formation of Great Britain; rocks belong partly to the Triassic period and partly to the Permian epoch, usually regarded as part of the Carboniferous period. For many years the name of the British formation was used to designate a unit of the geologic time scale, and formations in other countries, especially America, received the same name. The American formation to which the name was most frequently applied is now called Newark System.

New Rochelle, city of Westchester Co., N. Y.; on an inlet of Long Island Sound, locally known as New Rochelle harbor; 20 m. NE. of New York City Hall; residence of many New York business men; populous summer resort; contains several colonial Dutch and English mansions. Pop. (1910) 28,867.

New Rose. See SAFFRANINE.

New Siberian Islands, archipelago N. of Asia and NE. of the mouth of the Lena delta, so called from the name given to one of them (1806) by a Russian merchant. Being not far distant from the mainland, and often connected with it by an ice bridge, the fauna of these Arctic islands is particularly rich. The islands are also rich in fossil woods and the remains of extinct animals, notably those of the mammoth. In the island of New Siberia is a range of hills, partly composed of carbonized wood, apparently belonging to the Jurassic period.

New South Shet'land Islands. See SOUTH SHETLAND.

New South Wales, oldest state of the Australian commonwealth; bounded N. by Queensland, E. by the Pacific, S. by Victoria, the Murray River forming the boundary for about 600 m.; W. by S. Australia; area, 310,367 sq. m.; pop. (1908) estimated at 1,582,619, including over 4,000 aborigines; principal towns and cities: Sydney (capital), Newcastle (important port), Bathurst, Goulburn, Parramatta, Broken Hill, Maitland, Albany, Granville, Hamilton, Lithgow, West Maitland, Wagga Wagga, Tamworth, Wickham. Three distant and isolated islands—Norfolk, Pitcairn, and Lord Howe (combined area, 15 sq. m.)—are politically under the supervision of the governor. Coast, over 700 m. long, has numerous capes, headlands, and bays; many bays are excellent natural harbors, especially Port Jackson, on which Sydney is situated, Newcastle, and Botany

Bay. Surface broken at the E. by the Great Dividing Mountains, 20 to 120 m. distant from the coast, which include the Australian Alps (entering from Victoria and culminating in Mt. Kosciuszko, 7,350 ft. high); the Blue Mountains next, on the N.; the Liverpool range, which strikes a bold arc from the coast inland to beyond the Darling River, and the New England range, which resumes the direction, parallel to the coast, broken by the Liverpool range. The most important rivers are on the W. side of the great watershed, the chief being the Murray, Murrumbidgee, Lachlan, and Darling; on the E. side the most important are the Hawkesbury, Hunter, Shoalhaven, and Clarence.

Climate on the coast, warm and moist, and tempered by an ocean current; rainfall heaviest on the coast, and increases from S. to N. from 35 to 73 in. annually; rainy season in late summer and fall sometimes torrential; mean annual temperature in inhabited altitudes in mountain district, from 46° around Mt. Kosciuszko to 60° in the N.; frost and snow well known in the S.; mean annual rainfall, 25 to 35 in.; summers in the interior valley hotter than on the coast, and winters colder. Mineral products include gold, silver, silver-lead ore, copper, tin, zinc, coal (anthracite, kerosene shale, etc.), iron ore, building stones, limestone, fire clay, clay for brick and pottery, diamonds, sapphires, emeralds, rubies, and other precious stones; value gold mined, 1909, £869,546. Agriculture and grazing are important industries; chief crops: wheat, maize, barley, oats, potatoes, hay, lucerne, tobacco, sugar, grapes for wine, and oranges; production of wool, 1909, 370,808,000 lb.; climate so mild in the pastoral district that stock require no feeding in winter. Chief manufacturing industries: the smelting of ores, lumbering, production of metal works, machinery, etc., clothing and textile fabrics, articles of wood, clay, stone, glass. The preparation of food products, ship and boatbuilding, and publishing and printing are also important industries. About 2,700 vessels annually enter and clear the ports. Chief exports: Gold coin, wool, tin, copper, tallow, coal, hides and skin, meat (frozen and preserved); value total imports, 1909, £38,034,962; exports, £41,837,397.

Leading religious denominations, Church of England (nearly one half of the population), Roman Catholic, Presbyterian, Methodist, and Congregational. Leading educational institutions, Univ. of Sydney and a technical school. Capt. Cook and Sir Joseph Banks landed at Botany Bay, April 27, 1770, and on Banks's recommendation the home government decided to employ this spot as a penal colony. In 1787 Capt. Arthur Phillip was appointed governor of the new colony of New S. Wales (so named by Cook from a fancied resemblance of the coast to that of S. Wales), occupying the whole of Australia E. of the meridian of 135° E. and some small islands. He was sent out with about 800 convicts and a small military force, and founded Sydney. Convicts continued to arrive till 1841; gold was discovered 1851; constitution was conferred on colony 1855; Victoria was separated from the parent col-

ony 1857, and Queensland 1859; and Sydney was the scene of the inauguration of the first governor general of the Australian commonwealth, 1901.

New Spain. See MEXICO.

News'papers, printed sheets containing news, issued at regular intervals for distribution by sale or gratis. Modern journals convey intelligence of current events, report the transactions of public bodies, officials, etc., and contain also editorial comments on public questions, items of interest in the various fields of human activity, announcements, advertisements, market reports, communications from public and private persons, and in many cases short works of fiction.

The periodical collection and publication of the news of the day began in Europe with the weekly issue of *Das Frankfurter Journal*, by Egenolf Emmel, at Frankfort, Germany, in 1615, one hundred and sixty-three years after the invention of printing from metal types. There had been news sheets long before; in Europe the earliest were manuscript papers prepared with some regularity, and known in Rome as the *Acta Diurna* and in Venice as the *Gazetta*. According to tradition, the first printed news sheet appeared at Nuremberg in 1457, and was called the *Gazette*, but no copy is extant. Some 800 of these occasional news sheets, all issued before 1610, are preserved in libraries. The issue of the *Frankfurter Journal* was followed the next year (1616) by that of the *Nieuwe Tijdinghen*, at Antwerp; and in 1622 by the first newspaper in the English language, *The Weekly News*, begun by Nathaniel Butter, on May 23d of that year. The first daily paper in England, *The Daily Courant*, was issued in 1702, and the first penny paper, *The Orange Postman*, in 1709. The *Gazette de France*, the first French newspaper, was issued 1631. The first daily paper in France, the *Journal de Paris ou Poste au Soir*, appeared in 1777.

All the governments of Europe were early represented by newspaper organs, which are an easy means of communicating orders in council, special edicts, proclamations, and laws to the people. *The London Gazette* was the first of these; it was established in 1665, and is still published. It was originally *The Oxford Gazette*. The leading English newspapers are those of London, among which the most important are *The Times*, *Daily Telegraph*, *Standard*, *Daily News*, *Morning Post*, and *Daily Chronicle*, all morning dailies; *The Pall Mall Gazette* and *The St. James's Gazette*, afternoon dailies; and *The Observer*, a Sunday newspaper. French journalism deals less with news, and in many instances seems less successful in developing great permanent properties. Among the leading Paris journals are *Le Temps*, *La France*, *La Presse*, *Le Siècle*, *Le Constitutionnel*, the *Débats*, *La Justice*, *La République Française*, and *Figaro*. The most widely circulated newspaper in the world is *Le Petit Journal*, which often prints over 1,000,000 copies per day, sold at five centimes. Several newspapers in Germany, although hampered by the restrictions on the press, have attained great prominence, no-

tably the *Vossische Zeitung*, the *Norddeutsche Allgemeine Zeitung*, the *Neue Preussische Zeitung*, the *Volkszeitung*, the *Cologne Gazette*, and the *Hamburgische Correspondent*. In Russia newspapers are not permitted to discuss political questions, and a rigorous press censorship is maintained.

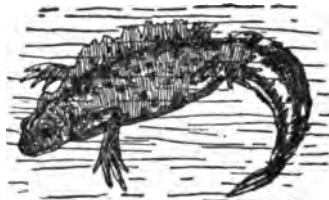
The most remarkable field for newspaper enterprise and newspaper literature has been the U. S.; and, in proportion to population, the development of newspapers has been far greater here than anywhere else. On April 24, 1704, was published in Boston *The News-Letter*, which has often been called the first newspaper printed in America. *The News-Letter*, in its early days, was sometimes printed on a single sheet, foolscap size, but oftener on a half sheet, with two columns on each side. It went out of existence when the British troops evacuated Boston in 1776. It enjoyed a monopoly of journalism in America for fifteen years, and yet had a circulation of only 300 copies. Other early American newspapers were the *Boston Gazette*, *The American Weekly Mercury*, and *The New England Courant*. The most important newspaper, politically, in early colonial times was *The New York Weekly Journal*, started in New York in 1733. *The Daily Graphio* of New York is believed to have been the first illustrated daily newspaper in the world. Up to 1833 newspapers in the U. S., whether daily or weekly, were distributed almost exclusively by subscription, and at a price which, considering their size and the amount of reading matter they gave, would now seem high. It was only by becoming an annual subscriber that one could obtain a city paper for less than six cents. There were no street sales, no news-stands or news agencies, but small sales at the offices. No paper in the country in 1835 circulated over 5,000 copies; very few over half that number.

The period since the Civil War has been marked also by the rapid development of local journalism throughout the U. S. Nearly every city of 15,000 inhabitants must have its own daily paper. An immense system of printing what are called "patent insides" for such papers has sprung up, under which two pages of news and miscellany are edited and printed at some central office for a great multitude of smaller papers, the half-printed sheets being then forwarded to the several offices, to be filled out, in each, with the local news and editorial comment of its own locality. Another economical device for the small country papers is the use of what is called "plate matter." Late news, correspondence, and miscellany likely to be generally acceptable for such papers is put in type in a central office, say in New York or Chicago, and stereotype plates of it are then made and sold to the country press. Thus a country paper often presents to its few hundred readers four pages of attractive reading matter, of which less than a page has been prepared and put in type in its own office. *The Annual*, published by N. W. Ayer & Son, reported the number of newspapers published in 1909 in the U. S. as 22,645, and in Canada as 1,365. The total number published in the world is estimated at about 60,000, and of

these more than half are printed in the English language. See PERIODICALS.

New Style. See CALENDAR.

Newt, name applied to various small, tailed batrachians of the genera *Triton*, *Salamandra*, etc., but particularly applicable to *Triton cristatus* of Europe. They frequent ditches and



CRESTED NEWT (*Molge cristata*).

sluggish water generally, feeding on insects and other animal matter. They are harmless, although they are popularly regarded as venomous.

New Testament. See BIBLE, THE.

Newton, Sir Charles Thomas, 1816-94; English archæologist; b. Bredwardine, Herefordshire; assistant curator of antiquities in the British Museum, 1840-52; then appointed vice consul at Mytilene; explored the islands and coasts of the Ionian Archipelago, making extensive excavations at Budrum (Halicarnassus) on the site of the mausoleum erected by Queen Artemisia, and at Cnidus and Branchidæ. At Constantinople disinterred the Serpent of Delphi. He was keeper of the Greek and Roman antiquities of the British Museum, 1861-85; became Prof. of Archæology at University College, London, 1880. His splendid collection of coins, inscriptions, sculptures, and vases, acquired by excavation or purchase, he deposited in the British Museum.

Newton, Sir Isaac, 1642-1727; English physicist; b. Woolstrop, Lincoln; in boyhood constructed mechanical toys of great delicacy; before twenty-five discovered the binomial theorem and the differential calculus, or method of fluxions; became senior fellow at Trinity College, Cambridge, 1668, and Lucasian Prof. of Mathematics at the university, 1669. While sojourning at his country seat, 1665, he observed the fall of an apple from a tree, and conceived the identity of gravity with the force which holds the planets in their orbits, but, having started with the erroneous estimate then entertained of the earth's mass, was led to reject his theory as incomplete. His attention was then called to the subject of light, and by repeated experiment he showed that it is not homogeneous, but that a ray of white light is a resultant of innumerable rays of light possessing different colors, rates of vibration, and refrangibility. In 1671 he completed a reflecting telescope made with his own hands; 1672, was elected to the Royal Society of London; about this time, in investigating the colors of thin plates, invented his hypothesis of "fits of easy reflection and transmission." In 1682 a new measurement of an arc of the meridian came to his

knowledge; this gave him the information requisite to make again his calculation relative to gravity. The result justified his intense feeling; observation and calculation corroborated each other; the crowning glory of his life, the theory of universal gravitation, was complete. His discovery was given to the world under the title "Philosophiæ Naturalis Principia Mathematica," 1687. Two controversies embittered his life—one with Leibnitz, 1676, in regard to the authorship of the binomial theorem and the infinitesimal method, where both were independent discoverers; and another with Flamsteed, the first astronomer royal, in his later years. His principal works are "Principia," "Optics," "Arithmetica Universalis," "Analysis per Equationes Numero Terminorum Infinitas," "Methodus Differentialis," "De Mundi Systemata," "The Chronology of Ancient Kingdoms Amended," "Table of Assays," "Optical Lectures," "A Method of Fluxions and Analysis of Infinite Series." He was buried with great pomp in Westminster Abbey.

Newton, city of Middlesex Co., Mass., on the Charles River, 7 m. W. of Boston; contains several villages; is noted for the healthfulness and beauty of its location; has the Newton Theological Institution (Baptist), Lasell Female Seminary, Fish School for Boys, W. Newton Classical School. Its manufactures include rolling, paper, and print-cloth mills and boot and shoe, hosiery, carriage, cordage, emery cloth, glue, dye, ink, and soap factories. Pop. (1910) 39,806.

New Year's Day, first day of the new year; widely observed as a day of festivity; but the day on which the year begins varies much in different countries. In the Roman Catholic Church, since the establishment of the Gregorian year (or new style), it falls on the festival of the Circumcision, a holiday of obligation, which is also the feast day of several saints, of whom St. Sylvester is the most widely honored. In the other churches it has no specially religious character.

New York (named from York, England, in honor of the Duke of York); popular name, **EMPIRE STATE**; state flower, rose; state in the N. Atlantic division of the American union; bounded in part on the S. and E. by the Atlantic, while Long Island Sound is the boundary N. of the island which gives the name; also by New Jersey and Pennsylvania; E. by Connecticut, Massachusetts, and Vermont, with Lake Champlain setting off the last-named state; W. by a point of New Jersey near the ocean, by Pennsylvania near Lake Erie, by the E. waters of that lake, by the Niagara River, adjoining Canada, and by Lake Ontario; N. by L. Ontario, St. Lawrence River, and Canada; area, land and water, 49,204 sq. m.; extreme length, N. to S., 311½ m.; extreme breadth, 412 m., including Long Island; pop. (census of 1910) 9,113,614; principal cities, in order of population, 1910, New York City, Buffalo, Rochester, Syracuse, Albany (capital), Yonkers, Troy, Utica, Schenectady, Binghamton, Elmira, Auburn, Jamestown, Amsterdam, Mount Vernon, Niagara Falls, New Rochelle, Poughkeepsie, New-

burgh, Watertown, Kingston, Cohoes, Oswego, Gloversville, Rome, Lockport, Dunkirk, Ogdensburg, Middletown, Watervliet, Ithaca, Olean, Cornwall, Little Falls, North Tonawanda, Hudson, Plattsburg, Rensselaer, Johnstown.

Besides the navigable waters which form so large a part of its boundaries, and the East River, a strait of the sea separating Manhattan Island and Westchester Co. from Long Island, the state has facilities for navigation in lakes George, Schroon, and Saranac in the NE., in Otsego, Oneida, Cazenovia, Onondaga, and Skaneateles in the central region, and in Oswego, Cayuga, Seneca, Canadaigua farther



W., and in Chautauqua Lake in the extreme W. The Hudson River, near the E. border, is navigable for 151 m. from the ocean, and is the chief feature in the river system, notable from the fact that the waters run to all points of the compass. The Mohawk flows 135 m. from the W. into the Hudson, carrying many branches, such as the E. and W. Canada creeks from the N. and the Schoharie from the S. Into the Oswego River, which has several affluents, the lakes from Oneida to Canandaigua discharge, and through that river into Lake Ontario, and thus into the St. Lawrence. The Genesee, rising in Pennsylvania, crosses New York and falls into Lake Ontario. In the S. central region the Chenango, the Tioga, and the Chemung empty into the Susquehanna, which seeks the ocean through the Chesapeake, while farther E. various streams contribute to the Delaware, finally emptying into Delaware Bay. In the NE. the Chazy and the Saranac flow into Lake Champlain, while the St. Regis, the Raquette, and the Oswegatchie, with others, are affluents of the St. Lawrence. In the W. counties Cattaraugus Creek runs into Lake Erie, while the Alleghany River, entering New York from Pennsylvania, returns to carry its waters into the Ohio, and thus into the Mississippi and the Gulf of Mexico.

The trend of the interior waters is determined mainly by the mountains and hills. These belong to the Appalachian system. On the E. the Green and Hoosac mountains wall the Hudson, while on the W. the Helderbergs, the Catskills, and the Shawangunk mountains shut in that river and turn the affluents of the Delaware. Several ranges in the NE. counties, of which

the Adirondack is the most prominent, are the highest in the state. Mount Marcy or Taha-was, in that range, is 5,379 ft. high. The Chateaugay range, extending from Lake Champlain to the Mohawk, in Herkimer Co., is dominated by Mt. Seward, 4,384 ft. high. The Mohawk valley furnishes the single pathway from E. to W. between the hills and mountains. Waters from such hills and mountains make falls which are grand and picturesque, like Niagara, on the river between Lake Erie and Lake Ontario; Trenton, on the W. Canada Creek; the high falls of the Genesee at Portage; the Taghanic and others, near Ithaca; and very many on streams in various counties. Islands are abundant. Manhattan Island is occupied by the busy part of New York City. Long Island and Staten Island are the largest of groups in the waters adjacent to the ocean. Lake George is beautified by many islands, varying in size. In the St. Lawrence the Thousand Islands are only a part of 1,500 lying between New York and Canada. The groups in the St. Lawrence and Coney Island, on the S. shore of Long Island, are popular summer resorts. Saratoga, near the upper Hudson; Richfield and Sharon, in the central counties, are noted watering places, while Chautauqua Lake has given name to a system of educational meetings.

Climate temperate, with marked changes of heat and cold and variations of moisture; maximum temperature of New York City 95°, minimum 6°; annual rainfall, 52.30 in.; average number clear days in the year, 82, with rain 144; corresponding figures for Albany, 98°, - 4°, 44.89 in., 59, 175; for Rochester, 95°, 6°, 43.09 in., 56, 208. About one half of the area of the state is adapted to cultivation, and the products include nearly all those of the temperate zone. Butter is made in considerable part in creameries receiving milk from a number of farms, while cheese comes mainly from factories. The dairy prospers chiefly in the central counties and on the lower Hudson. Hops are produced in Oneida, Lewis, Madison, Otsego, and Schoharie cos. Onondaga and Wayne cos. and the Chemung valley cultivate some tobacco, while broom corn is the favorite crop in the lower Mohawk valley. Grain is raised in the W. and SW. counties. Attention is given in N. New York to peas, beans, and potatoes. On Long Island, and in less degree near all the cities, market gardens thrive. In the central and W. parts apples, plums, pears, and cherries are abundant, and in the S. and W. peaches are raised, while grapes are cultivated along the Hudson and the interior lakes to the W., whence wines of acceptable brands are sent to market. Production of principal farm crops (1911): Corn, 20,405,000 bu.; wheat, 6,728,000 bu.; oats, barley, rye, potatoes, hay, and tobacco. Live stock (1911) included 609,000 horses, 4,000 mules, 1,495,000 milch cows and 884,000 other cattle, 911,000 sheep, 777,000 swine; total value, over \$175,000,000. The wool clip in 1911 yielded 2,055,330 lb. of secured wool, valued at \$924,885.

Mineral products include clay, cement rock, building stone, sandstone, marbles, granite, slate, iron ore (hematite, magnetic, limonite), salt (especially from Wyoming, Genesee, and

Livingston cos.), limestone, petroleum, glass sand, gypsum, natural gas, fibrous talc; value of products (1910) \$74,519,623; including stone, \$6,410,688; pig iron, \$32,410,165; clay products, \$11,871,949; salt, \$2,585,739; petroleum, \$1,414,668; natural gas, \$1,678,720; Portland cement, \$2,906,551, and exclusive of iron ore amounting to \$3,848,683.

Leading manufactures include combined textiles, carpets and rugs, cotton goods (including cotton small wares), felt goods, hosiery and knit goods, silk and silk goods, wool hats, woolen goods, worsted goods, clothing, iron, steel, foundry and machine-shop products, cars, lumber mill products, paper and wood pulp, sugar and molasses (refined), liquors, chemicals, electrical supplies and apparatus, tobacco and cigars, furniture, boots and shoes. "Factory-system" plants (1909), 44,935; capital employed, \$2,779,497,000; average number wage earners, 1,003,981; value of products, including custom work and repairing, \$3,369,490,000. The sea, river, and lake fisheries employ thousands of men, and the manufacture of oil and fish guano is an important industry.

The commerce of New York is in large part that of the nation, as its chief port serves not only for the state, but also for much of the continent. Besides New York City, there are eleven customs districts—Albany, Buffalo Creek, Cape Vincent, Champlain, Dunkirk, Genesee, Niagara, Oswegatchie, Oswego, Syracuse, and Sag Harbor. Value imports domestic and foreign merchandise, June 30, 1910-1, \$935,981,155; exports, \$871,783,571; tonnage of vessels entering ports, 17,492,795; cleared, 17,016,104. The principal canals wholly in the state are the Erie, from Albany to Buffalo, built 1817-62; Champlain, from Whitehall to Waterford, built 1817-37; Oswego, from Syracuse to Oswego; Cayuga and Seneca, from Montezuma to Cayuga and Seneca lakes, and Black River, from Rome to Carthage. In 1903 the legislature adopted and the people approved a bill to expend \$101,000,000 on the improvement of the Erie, Oswego, and Champlain canals.

Leading educational institutions: Columbia Univ., with which are affiliated Barnard College, for women, and the Teachers' College; New York Univ., College of the City of New York, all in New York City; Cornell Univ., Ithaca; Union College, Schenectady; Hamilton College, Clinton; Colgate Univ. (Baptist), Hamilton; Hobart College (Protestant Episcopal), Geneva; the universities of Buffalo, Rochester, and Syracuse; Vassar College, for women, Poughkeepsie; state normal schools at Albany, Brockport, Buffalo, Cortland, Fredonia, Genesee, Jamaica, New Paltz, Oneonta, Oswego, Plattsburg, and Potsdam, and the Normal College, for women, in New York City. (See NEW YORK, UNIVERSITY OF STATE OF.) State institutions for the insane, located at Utica, Poughkeepsie, Middletown, Buffalo, Willard, Binghamton, Ogdensburg, and Rochester; state institution for feeble-minded children at Syracuse, and one for feeble-minded women at Newark; state custodial asylum at Rome; educational institutions for the blind at New York City and Batavia, and for the deaf and dumb at New York City, Fordham, Malone, Albany,

Rochester, and Buffalo; reformatories at Elmira, Rochester, Canaan Four Corners, and Randall's Island, and for women at Hudson and Albion; soldiers and sailors a home at Bath; state prisons at Auburn, Dannemora, and Ossining (Sing Sing); separate buildings at Auburn for women convicts, and a hospital at Matteawan for insane criminals.

The coast of New York was discovered, 1524, by Giovanni da Verrazano, a Florentine navigator, who entered New York Bay and the "very great river." The region was then inhabited by Indian tribes, several of the Algonquin race dwelling in the SE. part, while the rest was occupied by the Iroquois, or Five Nations. In 1609 Samuel de Champlain sailed down the lake bearing his name, and in the same year Henry, or Hendrik, Hudson, an Englishman in the service of the Dutch East India Company, ascended the Hudson as far as where Albany now stands. A trading post was established on Manhattan Island by the Dutch, 1611; the beginnings of New Amsterdam, later New York City, were made 1612; even earlier a strong house, called Fort Nassau, had been erected just below Albany. In 1621 the Dutch West India Company succeeded the earlier traders, and, 1623, sent out a colony which settled on Manhattan Island and Long Island, and at Fort Orange, later Albany. A league with the Iroquois, maintained during the Dutch occupation, preserved the young settlements from massacre. In 1626 the government was made more formal, with Peter Minuit as director general, assisted by a council. In 1664 the English forced the Dutch to surrender Manhattan Island, set up a government, and compelled the towns to accept a code, "the Duke's Laws," the colony having been granted to the Duke of York by his brother, Charles II. Petrus Stuyvesant was succeeded by Gov. Andros, a charter of liberties was enacted, certain duties on imports were voted, and courts were established. When James II ascended the throne he repudiated the Charter of Liberties, and objected to the powers claimed "for the people met in general assembly." In 1689 an insurrection in favor of William of Orange occurred. Before the Declaration of Independence forty-four different persons served as executive head of the province, counting the Dutch directors. With most of the governors the assembly had differences over the revenue, and some of them, notably Fletcher and Cornbury, and later Clarke and the first George Clinton, rest under allegations of corrupt use of public moneys. To provide funds for expeditions against Canada paper money was first issued. The settlers reached out for trade with their neighbors N. of the St. Lawrence and the lakes, and to extend it a trading post was set up at Oswego, 1722. Relations with the Iroquois required frequent attention, the governors were inclined to arbitrary acts, efforts were put forth to promote education, while so urgent was the pressure for popular rights that, 1729, the Lords of Trade were notified that "most of the previous and open steps which a dependent province can take to make themselves independent at their pleasure are taken by the Assembly of New York." The French and Indian War, 1756-63, fell with es-

pecial severity on New York. With their Indian allies the French struck swiftly as far as the Mohawk, but in a sharp fight at Fort Edward, near Lake George, were repulsed by Gen. William Johnson. Hostilities raged on the upper Hudson, along the Mohawk W. to Oswego, then again on the shores of Lake Champlain. A defeat on Lake George, July, 1758, opened the door to Montcalm, but it was closed by the capture of Fort Frontenac in August, and the next year Fort Niagara surrendered to Gen. William Johnson, and the French were driven back from Ticonderoga and Crown Point. New York contributed its full share to the splendid victory on the Plains of Abraham, 1759.

In the next few years the colony manifested much discontent with British rule. It led in the union of the colonies, October 18, 1764, by clothing a committee of correspondence with power to correspond with its neighbors on the oppressive acts of Parliament and "on the impending dangers which threaten the colonies of being taxed by laws to be passed in Great Britain." In the Colonial Congress held in New York City October 7, 1765, the members of this committee took active part, and petitions for redress of grievances were presented to the king. The Stamp Act provoked violent protests, the patriotic association known as the Sons of Liberty was organized, and at last, January 18, 1770, a collision occurred in New York City resulting in bloodshed. This irregular fighting was the real beginning of the Revolutionary War.

During the Revolution, from the seizure of Ticonderoga, May 10, 1776, and of Crown Point, immediately afterwards, armies marched and countermarched on the soil of New York. Its chief city could not be successfully defended even by Washington, and from the autumn of 1776 until November 25, 1783, was in the hands of the British. In 1777 a constitution was adopted by the colony. The vast W. domain which New York claimed by royal grant, by purchase from the red men, and afterwards by the British treaty, it voted April 19, 1780, to transfer to the Union to become the Northwest Territory. The National Constitution was ratified July 26, 1788. The conflicting claims of New York and New Hampshire led to violent collisions, and more serious hostilities were averted only by the erection of the disputed territory into the State of Vermont, 1790.

Albany became the permanent capital, 1797. During the War of 1812, Ogdensburg was captured by the British, but they were beaten at Sackett's Harbor, and both sides claimed the victory at Chrysler's Farm. Fort Niagara was taken, and Black Rock and Buffalo burned by the British, who, in turn, July 5, 1814, suffered defeat by Gen. Winfield Scott at Chippewa, and July 25th at Lundy's Lane. An invasion by way of the Saranac and Lake Champlain was gallantly repulsed in September of the same year. A *levy en masse* of the militia of Herkimer, Oneida, Lewis, and Jefferson cos. was made for the defense of the N. frontier, while New York City exhibited equal activity against expected attack. Slavery was abolished, 1817. Out of the patrol system (see PATROONS) and the concentration of lands in few hands agrarian riots sprang up, 1839 and 1845, and on

a smaller scale, 1866. In the Civil War New York bore its full share, in spite of resistance to the draft in the chief city and threats elsewhere. The state was credited by the War Department with 448,850 men sent into the field and 18,197 who paid commutation. The first constitution of New York was in force forty-four years; that framed 1821 for twenty-five years; that of 1846, with some amendments, down to the adoption of the new constitution, 1894.

New York (the **NIEUW AMSTERDAM** of the original Dutch settlers), the chief city of the U. S. in population, commerce, manufactures, and finance; at the junction of the Hudson, at this point often locally called the North River, and the narrow strait forming the SW. extension of Long Island Sound, and known as the East River. The city includes Manhattan Island and some of the adjacent mainland N. of it, Governors, Bedloe, and Ellis islands, in the bay at the S. (these three the property of the U. S. Govt.), and Blackwell's, Ward's, Randall's, and a few minor islands in the East River or Sound; Staten Island and that part of Long Island comprised in the former cities of Brooklyn and Long Island City, and the former towns of Newtown, Flushing, and Jamaica, and part of Hempstead; politically divided since January 1, 1898, into the boroughs of Manhattan, The Bronx, Brooklyn, Queens, and Richmond; pop., 1890, 2,507,414; 1900, 3,437,202; 1910, 4,766,883. Manhattan Island is $13\frac{1}{2}$ m. long, and varies in width from a few hundred yards at each end to $2\frac{1}{2}$ m. at Fourteenth Street, the area being about 22 sq. m. It is separated from the mainland by Harlem River, a navigable tidal waterway, and Spuyten Duyvil Creek. The total land area of the greater city is 326.89 sq. m.; its extreme length 32 m., and its greatest width, 16 m.

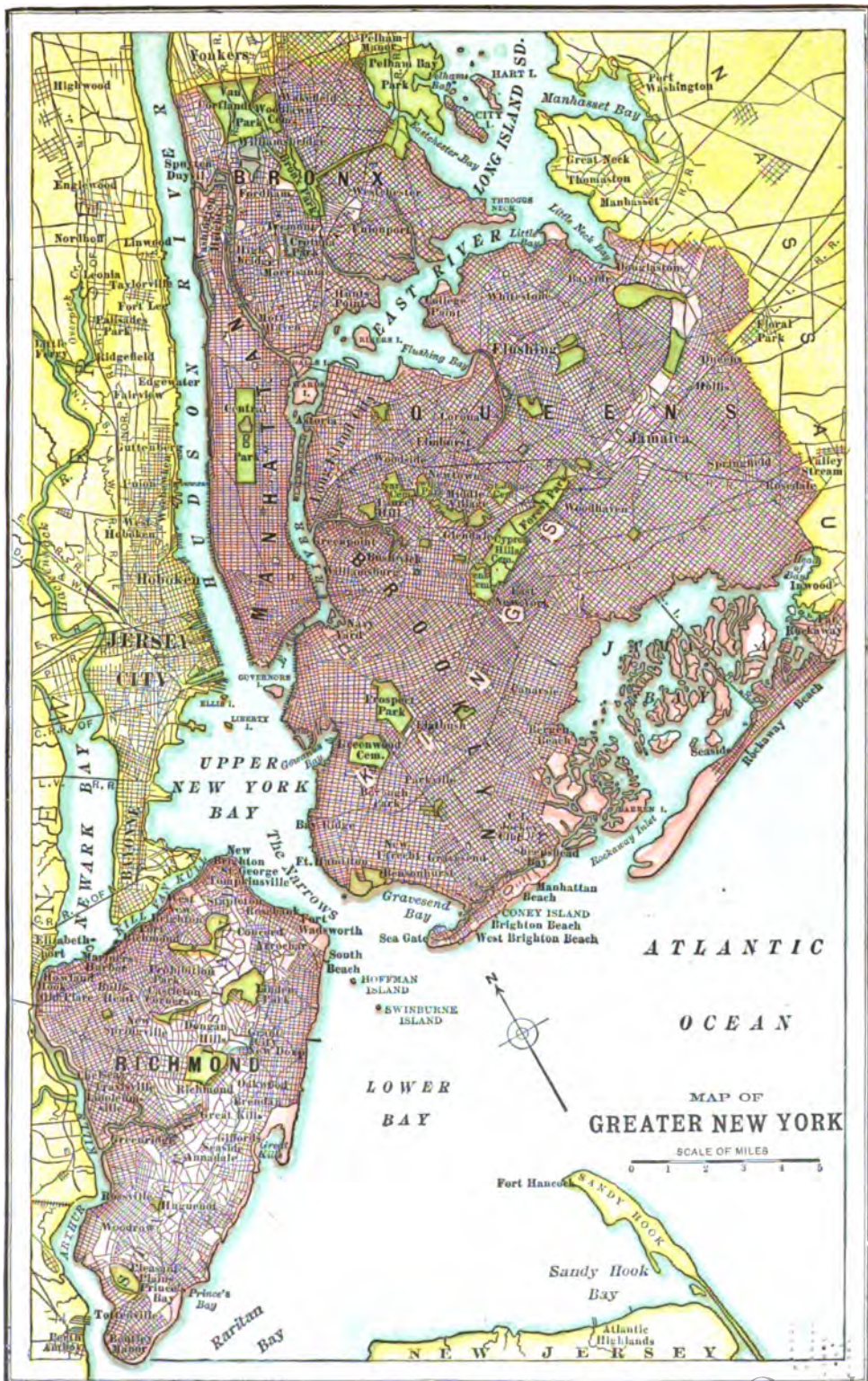
Numerous villages and towns have been absorbed by New York in its growth, the names of some of which are still applied to corresponding parts of the city; among them, on Manhattan Island, are Greenwich and Chelsea, on the Hudson, in the lower central portion of the city; Yorkville, on the E. side, at Eightieth Street, and Harlem, also on the E. side, farther N.; and Bloomingdale, Manhattanville, Carmanville, Fort Washington, or Washington Heights, and Inwood, on the W. side, extending in a line along the Hudson from the central part to the N. end of the island. The surface of the land is generally rolling, and in some places hilly, the highest point on Manhattan Island, at Washington Heights, being 238 ft. above tide level. Broadway is the principal thoroughfare of the business region, a wide avenue extending lengthwise through the S. and central part of Manhattan Island. N. of Fifty-ninth Street its extension, formerly known as the Boulevard, pursues a somewhat winding course.

Fifth Avenue is a sort of "median line," dividing the cross streets from Ninth to One Hundred and Fortieth into E. and W. Below Fifty-seventh Street the avenue is largely devoted to business establishments of the highest class, clubs, hotels, etc.; above that point it is one of the most fashionable residence streets of the city. Wall Street and adjacent portions of

New, Broad, Nassau, and William streets are the seat of financial interests. The wholesale dry-goods trade is chiefly centered on Broadway and the streets immediately W. of it from Leonard to Houston, while the fashionable retail shopping trade occupies Broadway from Tenth to Forty-second streets and portions of Fifth and Sixth avenues and Fourteenth, Twenty-third, and Thirty-fourth streets. The most important pleasure grounds are Central Park, in the heart of the city, 840 acres in area; Morningside Park, a long, narrow pleasure ground on the steep E. face of the high ridge W. of Eighth Avenue, between One Hundred and Tenth and One Hundred and Twenty-third streets; Riverside Park, a similar strip, twice as long, on the W. slope of the same ridge, running down to the Hudson; Van Cortlandt Park, 1,069 acres; Crotona Park, 135 acres; Bronx Park, 653 acres, and Pelham Bay Park, 1,700 acres. The Botanical Garden (250 acres) and the Zoological Garden (261 acres) are in Bronx Park.

The harbor comprises the lower bay, upper bay, East River, and S. part of the North or Hudson River, and may be entered from the Atlantic either from the NE., by way of Long Island Sound, or from the E. and S. by way of the channels at Sandy Hook. The latter is the more frequented course for ocean-going vessels. The lower bay, which includes also Raritan, Sandy Hook, and Gravesend bays, affords 88 sq. m. of anchorage. It is entered by two channels near Sandy Hook. In this bay are two small islands of artificial construction, Swinburne and Hoffman, and occupied by the hospitals, etc., of the quarantine station. The N. point of Sandy Hook, called Fort Hancock, is elaborately fortified for harbor defense. From the lower bay entrance is had to the upper bay through a picturesque strait called the Narrows, 8 m. from the city. This strait, scarcely a mile wide, is defended by forts Hamilton, Tompkins, and Wadsworth. A narrow and winding channel, known as Staten Island Sound, Arthur Kill, and Kill von Kull, also connects the two bays, but is used only by vessels of light draught. The upper bay, or harbor proper, has 14 sq. m. of anchorage, and contains Governors Island, used as a national military station; Ellis Island, where all immigrants are landed, and Bedloe's Island, crowned with Bartholdi's colossal statue of "Liberty Enlightening the World." The North River averages a mile in width, is deep enough for the largest ships, and affords 16 m. of available water-front. The East River is less than half as wide as the North, but is as deep. The NE. entrance to the harbor, from Long Island Sound, leads through Hell Gate into the East River. At Throgg's Neck is Fort Schuyler, and there are also extensive fortifications on Willett's Point and David's Island.

Among religious edifices, the Cathedral of St. John the Divine (Protestant Episcopal), on Cathedral Heights, stands preëminent. Other structures include Trinity Church (Protestant Episcopal), at the head of Wall Street, and St. Paul's Church (Protestant Episcopal), interesting on account of their historic associations; St. Patrick's Cathedral, with twin spires 330 ft.



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high, on upper Fifth Avenue; Grace Church (Protestant Episcopal), "Old First" (Presbyterian), Madison Square Presbyterian Church, Broadway Tabernacle (Congregational), Judson Memorial Church (Baptist), Fifth Avenue Collegiate Church, Temple Emanu-El and Temple Beth-El, the Christian Science churches on Central Park West. Among notable public buildings are the City Hall, dating from 1803-12; U. S. Post Office, Produce Exchange, County Courthouse, Cotton Exchange, Chamber of Commerce, Customhouse, Clearing House, U. S. Subtreasury, Criminal Courts Building, connected with the "Tombs," or City Prison; Singer Manufacturing Building, forty-one stories in height; Bowling Green Building, twenty-nine stories; Empire Building, twenty-eight stories; Flatiron Building, Times Building, World and Tribune buildings, Appellate Court Building, New York Life, Metropolitan Life, Equitable, Manhattan, Mutual Reserve, and Home Insurance buildings; Gorham Company, Tiffany, Altman, Wanamaker, Macy, and Clafin stores; St. Regis, Plaza, Belmont, Waldorf-Astoria, Manhattan, and Astor hotels; American Fine Arts Society Building, Metropolitan and Manhattan opera houses, Madison Square Garden, another place of entertainment; Hippodrome. The principal public monuments are Grant's Tomb and the Soldiers and Sailors' Monument, both on Riverside Drive, and the Washington Memorial Arch, in Washington Square.

The system of public education in New York City comprises the College of the City of New York, an institution of regular collegiate rank, for boys; the Normal College for girls, and a complete system of primary, grammar, high, and evening schools, a nautical school, and many corporate schools (industrial, reformatory, etc.), under direction of the Board of Education. Besides the colleges of the public-school system, there are Columbia Univ., with which are associated Barnard College, for women, and a teachers' college; New York Univ., St. John's College, at Fordham; the College of St. Francis Xavier, Union Theological Seminary, the General Theological Seminary of the Protestant Episcopal Church, the College of Dentistry, the College of Pharmacy, the College of Economics, several colleges of medicine, and many others for general or special instruction. Schools of art, law, music, architecture, design, mechanics, business training, and industrial trades abound. The Cooper Institute gives free instruction in many useful and practical branches of learning, and the Shipbuilding Academy affords thorough tuition in shipbuilding and general seamanship. The National Academy of Design, the School of Applied Design, for women; the Art Students' League, and the schools connected with the Metropolitan Museum of Art are among the foremost seats of art study and teaching. Libraries include the New York Public, comprising the Astor, Tilden, and Lenox foundations and the New York Free Circulating Library and some forty-two branches (Carnegie libraries); the Society Library, founded 1740; Mercantile Library, Mechanics and Tradesmen's Library, and those of the Historical Society and the Genealogical and Biographical Society.

The principal museums are the Metropolitan Museum of Art, in Central Park, and the American Museum of Natural History, in Manhattan Square, adjoining Central Park. Among the many hospitals are St. Luke's, Bellevue, Charity, Cancer, Lying-in, Mt. Sinai, New York, Presbyterian, Roosevelt, St. Vincent's, and Women's.

The water supply is drawn from great reservoirs in the basin of the Croton River, about 40 m. from the city, which supply some 375,000,000 gallons per day, and from a great reservoir in the Catskill Mountain region. Local transportation facilities include five lines of elevated railways and several subways. The ferries on the North and East rivers convey scores of thousands daily to and from the suburbs, and tunnels under these rivers give railway communication with New Jersey and Long Island. The stations of the New York Central and the Pennsylvania railroads are noteworthy for their size. Manhattan Borough is connected with Brooklyn Borough not only by tunnel, but by the Brooklyn Bridge, 6,000 ft. long; the Manhattan Bridge, total length 6,500 ft., and the Williamsburg Bridge, 7,200 ft. long, and the Queensborough Bridge. The Harlem is spanned by a number of bridges, among them the lofty and graceful Washington Bridge. General domestic travel is facilitated by the centering at New York City of a dozen important trunk railways and numerous subsidiary lines, several important steamboat lines on Long Island Sound and the Hudson River, and a vast coasting trade with E. and S. ports. Foreign transportation is represented by nearly all the transatlantic steamship lines. Most of the railways have their termini in Jersey City, Hoboken, Brooklyn, and Long Island City, whence passengers and freight are transferred to Manhattan by tunnel or ferry.

The principal manufactures of Greater New York are those of clothing and trimmings, machinery, foundry products, malt liquors, refined lard, sugar and molasses, tobacco and cigars, musical instruments, millinery and lace goods, furniture, jewelry, hats and caps, leather goods, electrical apparatus, and boots and shoes. Printing and publishing, slaughtering and meat packing, and the roasting and grinding of coffee and spices are very important industries. "Factory-system" plants (1909), 25,938; capital, employed, \$1,364,353,000; value of products, \$2,029,693,000. New York City is the leading port of the U. S. Imports of domestic and foreign merchandise for year ending June 30, 1911, \$881,592,689; exports, \$772,552,449; imports of gold, \$26,746,726; exports, \$4,060,718; tonnage of vessels in the foreign trade entered, 13,428,950; cleared, 13,366,893. Vessels of 10 ft. draught pass from the Hudson to Long Island Sound through the Harlem Ship Canal.

Much of the early history of New York City may be found in the article on New York State. A permanent village settlement was effected, 1623, under the name of New Amsterdam; the place was incorporated as a city, 1652. On the seizure of the colony by the English, 1674, the city was renamed New York. In 1673 a Dutch fleet seized it and renamed it New Orange, but a year later it was

restored to the English. In 1691 the first Colonial Assembly met in the city; 1768, the Chamber of Commerce was organized; 1776, the bulk of the American army was massed here, but after the battle of Long Island the troops withdrew to the N., and several skirmishes were fought on Harlem Heights. The city was occupied by the British, 1776-83. Here, at Fraunce's Tavern, still standing, Washington took leave of his officers. The city was the capital of the young republic, 1785-91, and Washington was inaugurated as President here, 1789. In 1807 the steamer *Clermont* began regular trips to Albany; transatlantic steam navigation began, 1819, with the *Savannah*, built at New York City. In the War of 1812 the port was blockaded by the British, but the city was defended against invasion. On November 11, 1826, the first canal boat arrived from Buffalo by way of the newly finished Erie Canal. In 1832 the city was ravished by Asiatic cholera, and, 1835, a fire destroyed 600 buildings and more than \$20,000,000 worth of property.

The first American World's Fair was opened in what is now Bryant Park, 1853. In 1863, mobs, chiefly of foreign-born persons, opposed the enforcement of the Draft Act, killing or wounding more than 1,000 men and destroying about \$2,000,000 of property. In 1870-71 the notorious Tweed ring was exposed and overthrown; 1869, occurred the famous "Black Friday," arising from an unsuccessful attempt to "corner" gold. Impressive public ceremonies were the funerals of Horace Greeley, 1872, and Gen. Grant, 1885; the reception to Admiral Dewey, 1899; the celebration of the 400th anniversary of the discovery of America, 1892, and the demonstrations in honor of the memory of Columbus, 1893. On January 1, 1898, the former New York City, Brooklyn, and other adjacent cities were consolidated as Greater New York. In the fall of 1909 the Hudson-Fulton celebration took place.

New York System, in geology, a division of the Paleozoic rocks in N. America, including representatives of the Cambrian, Silurian, and Devonian periods. In the systematic work of the Geological Survey of New York, it was found impossible to classify the formations in accordance with the categories which had been established by earlier work in Europe; and the geologists not only gave local names to the individual formations of the state, but grouped them under classic terms which were in part novel. The New York System comprises all the formations of the state from the Potsdam sandstones below to the Chemung group above, both inclusive.

New York University, institution of learning, on University Heights, Bronx Borough, New York City; coeducational in departments of law, pedagogy, graduate, and commerce; chartered 1831, opened 1832. In 1832-35 a building was erected on Washington Square, and was replaced, 1894-95, by a larger structure intended partly as a source of income and partly for the accommodation of the School of Law, School of Pedagogy, the Graduate School, and School of Commerce, Accounts, and

Finance. In 1892 a tract of twenty acres, on the Harlem River, was purchased, on which new buildings for the undergraduate department were erected. These include a splendid new library, to which is attached the Hall of Fame. The university has about 300 professors and instructors, over 3,600 students in all departments, 10 fellowships, 80 scholarships; over 100,000 volumes in library.

New York, University of State of. See **UNIVERSITY OF THE STATE OF NEW YORK.**

New Zealand, British Dominion in S. Pacific Ocean, about 1,000 m. SE. of Australia; consists of three main islands; N. or New Ulster, 44,468 sq. m.; pop. (1906) 476,732; S., New Munster, or Middle, 58,525 sq. m.; pop., 411,340; Stewart, or New Leinster, 665 sq. m.; pop., 304; and minor islands, Cook, Chatham, and Kermadec; total area, 104,751 sq. m.; pop. (1910) estimated at 1,048,347; capital, Wellington; other chief towns, Auckland, Christchurch, Dunedin, Palmerston North, and Napier. New Zealand lies on a great submarine plateau which in the NE. joins that of Polynesia, NW. that of New Guinea and Queensland, and to the S. that of the Antarctic seas. The coasts of the colony are more than 4,000 m. in length. There are many natural ports, especially on the N. ends of N. and Middle Islands, and on the E. coast of Stewart Island. The harbor of Auckland is especially commodious, and approaching within a mile of its waters, and only 2 or 3 m. of the city, is the greater harbor of Manukau, entering from the opposite coast. A mountain range begins E. of the center of N. Island, and extends SW. to the S. angle of Middle Island. On N. Island it is relatively low, not exceeding 6,000 ft.; on Middle Island it hugs the W. coast from the middle to the S. and culminates in Mt. Cook, 13,349 ft. high. This range is called the S. Alps. The plains lie mostly in the SW. quarter of N. Island. The rivers are usually rapid, short, closed by bars at their mouths, and not adapted to navigation. There are two lake regions in the islands, one on Middle Island, the other on N. Island. From Lake Taupo in a NE. direction to the Bay of Plenty lies the lake district, remarkable for its geysers, hot and sulphurous springs, and natural terraces.

In general the climate is mild, agreeable, and healthful. The mean annual temperatures are about those of Virginia and Delaware near the coast, but the summers are as cool as those of New Brunswick and Nova Scotia. The mean difference between the temperatures of the hottest and coldest months is only 14°, or about that of Cuba.

It is estimated that two thirds of the land is suitable for cultivation or grazing. Of this about one fifth is under actual cultivation. The wheat produced is generally more than sufficient for home needs; oats are extensively grown; barley and hay are important crops; maize is but little grown, likewise tobacco and the vine. Tasmania and New Zealand are the only ones of these colonies producing potatoes for export. Live stock (1909) comprised 23,480,707 sheep, 1,773,326 cattle, 363,259 horses, and 245,092 swine. The wool clip (1909) was

194,886,524 lb., of which 189,683,703 lb. were exported. The manufacturing industries employed (1905) 49,806 persons and £11,814,013 capital, and had products valued at £22,422,726, chiefly represented by meat packing, tanning, wool scouring, lumber and grain milling, and the manufacture of clothing, boots and shoes, butter, cheese, and iron and brass goods. Chief mineral products are gold, coal, silver, manganese ore, and Kauri gum, the latter peculiar to the colony and used as a base for fine varnishes and other purposes; value of total exports of gold to December 31, 1907, £71,528,978; in 1909 alone, 506,371 oz., valued at £2,006,900. Commerce (1909) showed value of imports, £15,674,719; exports, £19,661,996; registered shipping, 262 sailing and 327 steam vessels, of 150,840 tons.

Executive authority is vested in a governor appointed by the crown; legislative in a General Assembly of two chambers, Legislative Council (1910) of forty-two appointed members, and House of Representative of eighty elected members; judicial in a Supreme Court of six judges, district courts, magistrate courts, and justices of the peace; for local government, colony is divided into boroughs and counties, the latter subdivided into road and town districts. There is no state church, nor is state aid given to any form of religion; principal denominations, Anglican, Presbyterian, Methodist, Roman Catholic, Baptist, Congregational. Protestant members, 719,087; Roman Catholic, 127,227. Educational system headed by Univ. of New Zealand, solely an examining body, with five affiliated colleges—Otago Univ., Dunedin; Canterbury College, Christchurch; Lincoln College, Canterbury; Auckland Univ. College and Victoria Univ., Wellington; total number of students (1907), 1,325; 29 endowed and incorporated secondary schools, over 1,963 public primary and 302 private schools, and 99 native village schools. Approaches to principal ports defended by batteries of heavy ordnance, supplemented by torpedo boats and submarine mines; small permanent militia; volunteer militia, 18,545 officers and men. The aborigines are of a Polynesian race called Maori, fine looking, though short and rather squat; numbered (1906) 47,835. New Zealand was discovered by Tasman, 1642; visited several times by Cook, 1769-77; first settled (by missionaries), 1815; attached officially to New South Wales, 1833; made independent colony, 1841; granted constitution and responsible government, 1852; present system of government superseded provincial form, 1875; women allowed to vote, but ineligible to either branch of General Assembly.

Ney (nā), Michel (Duke of Elchingen, Prince of Moskva), 1769-1815; marshal and peer of France; b. Saarlouis; entered the army, 1788; made brigadier general, 1797, after the battle of Neuwied, general of division, 1799, after he had greatly distinguished himself by the capture of Mannheim and in Masséna's campaign, and marshal, 1804; commanded in the Austrian, Prussian, and Spanish campaigns, and distinguished himself at Elchingen, Jena,

Eylau, and Friedland; ordered to Spain, 1808; was successful in maintaining French rule over Galicia; met with reverses in Portugal, 1810; greatest exploits were the battle of Borodino while the grand army crossed the Moskva, his command of the rear guard during the retreat from Moscow, and his exertions in order to organize a new army. In the Waterloo campaign Ney fought the battle of Quatre Bras against the British on the same day that Napoleon defeated the Prussians at Ligny, and at Waterloo commanded the center with great bravery. After the second restoration he was captured, arraigned for high treason, and shot in the garden of the Luxembourg, where a monument now stands in his honor.

Nez Perces (nā pēr-sā'), tribe of N. American Indians, living partly in Idaho and partly in Washington; generally considered progressive and loyal to the whites till 1877, when a portion, angered at a reduction of their reservation, broke out in revolt, murdered settlers, fought troops sent against them, were chased across Idaho, Montana, and Dakota, overtaken and defeated, and distributed as above.

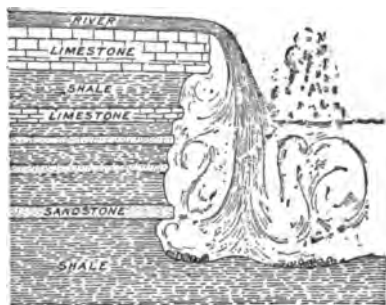
Niag'ara (Iroquois Indian word meaning "thunder of water"), river of N. America, forming the boundary between the State of New York and the Province of Ontario, Canada, and connecting Lake Erie with Lake Ontario; 33 m. long; has a total fall of 326 ft.; is navigable in its upper course from Lake Erie to the beginning of the rapids at Niagara Falls, 16 m., during which its fall is less than 20 ft.; and in its lower course from Lewiston to Lake Ontario, about 7 m., during which its fall is only 2 ft. Its middle course contains the celebrated Niagara Falls.

Niagara Falls, city in Niagara Co., N. Y.; on the Niagara River; 20 m. N. of Buffalo; river here crossed by three remarkable bridges, viz., the upper suspension, built of steel, a foot and carriage bridge about 300 ft. below the Falls on the U. S. side, 821 ft. span and 260 ft. above the water; the cantilever, 910 ft. in length, a short distance upstream from the Whirlpool Rapids, built 1883, the first bridge of its kind constructed in the U. S.; and the railway suspension, 300 ft. N. of the cantilever, built of steel, with a carriageway 28 ft. below the track. For ages the enormous power of the river was allowed to go to waste, though many projects were conceived to utilize it. The first practical step and triumph of engineering skill was the construction of a hydraulic canal, extending from a point above the Falls, through the center of the city to the gorge. From this a 5,000 h.p. was obtained. Since then a great tunnel has been completed at a cost of about \$4,000,000, and at the time of writing over 100,000 h.p. had been obtained on each side of the river. The land and islands surrounding the "American" Falls (that is, the Falls on the U. S. side) have been appropriated for a State reservation, and the land on the Canadian side of the river now constitutes a similar reservation. The industries include the manufacture of paper, pulp, flour, silver-plated

ware, paper coating, machinery, graphite, carborundum, railroad supplies, and foodstuffs. The city is the seat of Niagara Univ. (Roman Catholic) and De Veaux College (Protestant Episcopal). Pop. (1910) 30,445.

Also a Canadian city on the W. bank of the river, important for its manufactures and as a power-distributing center. Pop. (1911) 9,248.

Niagara Falls, cataracts of the Niagara River, discovered by Father Hennepin, 1678, and remarkable for volume of water rather than for height. Upstream (S.) from the Falls the river flows smoothly in a broad channel, little depressed below the general surface of the limestone upland of W. New York. About a mile above the Falls the river begins a descent of 50 ft. in the upper rapids. At the Falls it plunges 160 ft. into a narrow gorge about 7 m. long, 200 to 350 ft. deep, 800 to 1,500 wide at the top, and generally 250 to 500 wide at the water line. Except for the upper 2 m., the river pursues a tumultuous course in swift rapids, with a descent of 100 ft., emerging from the gorge at the cliffed margin or escarpment



NIAGARA FALLS.

Cross section showing geological formation and undercutting.

of the upland between Lewiston, N. Y., and Queenston, Ontario. The volume of water passing the Falls is 280,000 cu. ft. per second (U. S. Lake Survey). The river is divided by Goat Island just above the gorge, thus making two falls—the Canadian, or Horseshoe, Fall on the W., the “American” Fall on the E. The former has a strongly incurved brink measuring 3,010 ft. around the curved crest line, or 1,230 ft. across the chord. The face of Goat Island, separating the two falls, is 1,310 ft. The American Fall, with slight incurvature, measures 1,060 ft. from side to side. For 2 m. down the gorge, between the Canadian Fall and the lower rapids, the waters flow with relatively smooth surface through a great pool, 1,450 ft. in greatest width and 189 ft. in depth, just above the upper suspension bridge, the exceptional depth being attributed to the pounding action of the water beneath the fall.

The geological history of the Falls is of great interest, because of the association of the age with one of the closing stages of the glacial period. The origin of the limestone upland in which the gorge is cut consists of relatively resistant strata, 80 to 100 ft. thick and dipping gently to the S., of heavy Niagara (Silurian) limestone. The surface of the limestone has

been revealed by the gradual stripping off of overlying weaker rocks, and its former northward extension has been much reduced by the erosion of its margin. The retreat of the margin has been accelerated by the undermining of the weaker strata—Niagara, Clinton, and Medina shales and sandstones—beneath it; hence the upland is now terminated by a north-facing bluff or escarpment about 250 ft. above the lowland plain that stretches northward from its base, and nearly 40 ft. above the present level of Lake Erie. After the present form of the upland had been essentially produced by the slow weathering of ages, the region was glaciated, the entire surface being buried under a heavy ice sheet. It is commonly believed that the basin of Lake Erie in weaker rocks S. of the Niagara limestone upland and that of Lake Ontario in weaker rocks N. of the escarpment were in greater part excavated by ice action. It is difficult to measure the results of this process, but it is known that when the ice sheet evacuated the region the lakes occupied the basins, much as we now see them; and that wherever the former rivers of the region ran, the post-glacial discharge of Lake Erie took the course of the Niagara River across the plateau and fell over the escarpment on its way to Ontario; thus the cataract was formed at the face of the cliffs.

Since then the strong wearing of the river has caused the recession of the Falls at a much more rapid rate than the general retreat of the cliff face under the weak attack of the weather; thus the narrow gorge has been formed, and the Falls now stand about 7 m. back from their original position. Their recession continues, and eventually the gorge will be cut back to Lake Erie. The time required for the recession of the Falls has been the subject of much study. The Falls have been carefully surveyed on four occasions. First in 1842 under James Hall, of the Natural History Survey of New York; in 1875 by the U. S. Lake Survey; in 1886 by R. S. Woodward, of the U. S. Geological Survey; and in 1890 by A. S. Kibbe, of the New York State Engineers. The fall on the U. S. side shows moderate change, its average annual recession in forty-eight years being half a foot. Between 1842 and 1890 the Canadian Fall receded 150 to 230 ft. along a distance of 900 ft. on the western half of its front, and 270 ft. at the apex of its curve. This gives an average recession near the middle of from 4 to 6 ft. a year; and if this rate had been constant, only about seven thousand years would have been required for the erosion of the gorge. In 1848, 1903, and 1909 unusual winter conditions of wind and ice blocked up the channel above the Falls and rendered the precipice face practically dry for several days.

There is indication, however, that the recession of the Falls has not always been at so rapid a rate, and that its age is greater than seven thousand years. The Falls now supply a great amount of water power, and electricity is generated on a great scale. This is transmitted to Buffalo and other distant places.

Niagara Group, American geological formation representing part of the Upper Silurian

period; so named by the Geological Survey of New York on account of its typical development along Niagara River; is exposed throughout the breadth of New York a short distance S. of Lake Ontario, and has a thickness of 300 ft., consisting of shale below and limestone above. In Ohio, Michigan, and other W. states the shale becomes thin, but the limestone increases to 600 or 800 ft. The limestone is largely used for building purposes, especially for abutments of bridges, etc.

Niare (nī-ār'), Zamouse (zā-mōs'), or Bush Cow, wild ox (*Bubalus pumilus*) found in W. and W. Equatorial Africa; is of a rather small size; sometimes trained for the saddle, and may be taught to obey the bit as well as horses; but its pace is only 4 or 5 m. an hour.

Nias (nē-ās'), island of the Malay Archipelago, a short distance to the W. of Sumatra, near the equator; 70 m. long, with an average breadth of 16 m.; mountainous and surrounded with coral reefs, but is fertile, producing rice, sugar, and large quantities of pepper; inhabitants are estimated at from 200,000 to 250,000. They are closely allied in appearance and language to the Battas, an independent and warlike race in Sumatra.

Nibelung (nē-bē-lōng), mythical king of Norway; NIBELUNGS, his subjects; NIBELUNGENLAND, his territory.

Nibelungenlied (nē-bē-lōng-ēn-lēt), "song of the Nibelungs," greatest popular epic of the Middle High German period; was composed by an anonymous poet at the close of the twelfth century; is divided into cantos, called adventures, the number of which varies in the different manuscripts. We can further distinguish in the epic two great parts, in the first of which the scene is laid on the Rhine, with Worms as the center, while the chief events of the second part take place on the Lower Danube, at the residence of Attila, King of the Huns. The principal hero of the first part is Siegfried, Prince of the Netherlands, who assists Gunther, the King of the Burgundians, in obtaining the hand of Brunhilde, or Brynhild, the powerful Queen of Iceland, and who is rewarded with Kriemhilde, the beautiful sister of Gunther. The envy and jealousy of Brunhilde cause a quarrel between her and Kriemhilde, and finally lead to the murder of Siegfried by Hagen, the faithful vassal of Gunther and deadly enemy of Siegfried. The central figure of the second part is Kriemhilde, who, after the death of Siegfried, thinks of nothing but of avenging herself on the murderers of her husband. For this purpose she marries Attila, and invites Gunther, who had consented to the murder of Siegfried, to visit her with his Burgundians at Attila's residence. Contrary to the advice of Hagen, Gunther and his brothers, Gernot and Gieselher, accept Kriemhilde's invitation. They march to the Danube, and finally arrive at Attila's court, where, after a long and dreadful struggle, all are killed, including Kriemhilde. Only Attila, his friend Dietrich von Bern, and the latter's faithful companion Hildebrand, survive to lament the catastrophe.

The subject-matter of the poem is based upon the German hero legends which originated in the times of the migration of the tribes, and which formed the favored contents of many single hero songs previous to their final combination into one great epic. That this was a popular epic can be seen from the number of manuscripts still extant, among which three date back to the thirteenth century. While in former periods the poem had to suffer from unjust comparisons with Homer, it is now universally considered the greatest national epic of the Germans, in which the wild passions and valorous deeds of a heroic age and the most tender and sacred emotions of the human breast find their artistic expression. For although the characters of the epic appear in the knightly guise of the twelfth century, we can still notice that the principal heroes really belong to a more primitive period. With marvelous skill the author has depicted his times as well as those of the older heroic age, carefully preserving the epic style despite the lyrical character of the strophe which he employs, and thus creating a work of poetry rich in colors, full of dramatic life and of the deepest ethical sentiments—a picture of the Germanic character and mind in their period of youth.

Nicaragua (nē-kā-rā'gwā), republic of Central America; between Honduras on the NW. and Costa Rica on the S.; extending from the Caribbean Sea to the Pacific; estimated area, 49,532 sq. m.; estimated pop. (1911) over 600,000; capital, Managua; other important cities, Leon, Granada, Masaya, Chinandega, Bluefields, Corinto, and San Juan del Sur. The general outline is nearly an isosceles triangle; one side forms the Caribbean coast, which runs from N. to S. about 300 m.; the Pacific coast trends from SE. to NW. and terminates in the Bay of Fonseca, which separates Nicaragua from Salvador.

The main mountain axis enters the country from Honduras, passes across it in a SE. direction, and terminates at the San Juan River; is nearly parallel with the Pacific coast and about 90 m. distant from it. E. from this range the country falls to low and often swampy lands along the Caribbean coast. Near the Pacific coast, and roughly parallel to it and to the central range, is an irregular line of volcanic peaks. Between the volcanoes and the central range is the lake valley, 300 m. long, the most striking natural feature of Nicaragua. In it are the two beautiful lakes Managua and Nicaragua, respectively 134 and 110 ft. above sea level, and connected by a short river, the Panaloya or Tipitapa; from the SE. end of Lake Nicaragua the waters are discharged through the San Juan River, 108 m. long, to the Caribbean Sea. Though the outlet is to the Atlantic side, the lake valley is properly on the Pacific slope. Lake Managua is 32 m. long by 16 wide, and deep enough everywhere for the small steamers which ply on it. The Momotombo volcano, on its N. side, is one of the highest peaks in the country (6,255 ft.), and the shores everywhere are remarkable for their picturesque beauty. Lake Nicaragua is 92 m. long by 34 wide, and from

12 to 83 ft. deep; its three largest islands, Ometepe, Zapadero, and Solentiname, are simply mountains rising from the water, and the first is a more or less active volcano. At one point the lake is separated from the Pacific by a neck hardly 12 m. wide, and without high hills; here it was proposed to make the Pacific section of an interoceanic ship canal.

The constitution (1905) vests the executive authority in a president, appointed for six years, assisted by a council of five ministers; legislative in a congress of one house of thirty-six members, elected for six years; judicial in a supreme court, two chambers of second instance, and several inferior tribunals. For administrative purposes the republic is divided into thirteen departments, two comarcas, and three districts. The former Mosquito Reserve forms the department of Zelaya. The common language is Spanish, but some of the Indians still speak their own dialects. Roman Catholic is the prevailing religion. Education is promoted by over 300 elementary schools, ten colleges, two universities, and a National Industrial, Commercial, and Scientific Museum has been opened in Managua. Army on peace footing, 4,000; in war, 40,000; military service obligatory, seventeen to fifty-five years of age. Principal industries, agriculture, coffee growing, cotton planting, tobacco growing, cattle breeding, gold mining, and the collecting of rubber, dyewoods, gums, and medicinal plants. The coast of Nicaragua was discovered by Columbus, 1502; Gil Gonzalez Davila first explored the country and found a large Indian population, 1523. Granada and other towns were founded by Francisco Hernandez de Cordoba, 1524-25; Nicaragua was a province of Guatemala till 1821; state in Central American Confederation, 1823-39; in Greater Republic of Central America, 1896-98; signed treaty empowering the U. S. to construct a canal across it, 1867; denounced it, 1901; signed protocol to lease to the U. S. a strip of territory for a canal route in latter year; treaty between U. S. and Great Britain modified Clayton-Bulwer Treaty (1850) and neutralized proposed canal, 1901.

Nic'cola Pisano (pě-ză'nō). See PISANO.

Niccolini (nēk-kō-lē'nē), **Giovanni Battista**, 1785-1861; Italian poet; b. near Pisa; librarian and Prof. of History and Mythology in the Academy of Fine Arts in Florence; dramatic works include "Polissena," "Ino e Temisto," "Medea," "Edipo," "Matilda," "Nabucco," "Antonio Foscarini," "Arnaldo da Brescia," and "Filippo Strozzi." His "Lessons on Mythology" was published 1855.

Nice (nēs), ancient *Nicaea*, now **ISNIK**, ancient city of Asia Minor, in Bithynia, on the E. shore of Lake Ascania, 54 m. SE. of Constantinople; disputed with Nicomedia the title of metropolis of Bithynia; was long a bulwark against the Arabs and Seljuks; was conquered by the latter abt. 1080; taken from them in the first crusade, but soon restored. In 1204 Theodore Lascaris made Nicaea the capital of a Greek kingdom or empire, which Michael Palaeologus, 1261, united with that of Constantinople. It surrendered to Orkhan, 1330,

and was incorporated with the Ottoman Empire. The modern Isnik is a place of no importance.

Nice, capital of department of Alpes-Maritimes, France; at the foot of the Alps, on both sides of the mouth of the Paglione; 140 m. E. by N. of Marseilles; consists of the old town, the new town, and the port, all connected; has spinning and weaving factories, and manufactures of artistic pottery, wax, essences, and perfumeries; flowers and fruits are raised on a large scale, and the preservation of the latter forms a prominent industry. Its trade in oil, wine, hemp, and silk is also very important. In 1388 it acknowledged the supremacy of the house of Savoy, and, 1814, became part of the Kingdom of Sardinia, but was, 1860, ceded to France. Pop. (1906) 134,232.

Nice, Councils of, two ecumenical councils held in Nice, Bithynia; the first (325), consisting of 318 bishops, was the first General Council of the Christian Church, and the most important of the series. It condemned Arius, formulated the Nicene Creed, and determined when Easter should be observed. The second (787), reckoned the seventh ecumenical, of 350 bishops, sanctioned the use of pictures in worship.

Ni'cene Creed, a summary of the chief tenets of the Christian faith; first adopted at the Council of Nice, 325 A.D. This creed sets forth the faith of the Church in respect to the errors of Arianism. It is admitted by many Protestant churches, and is held as authority in the Roman and Greek churches. The form in which the Nicene Creed now appears in the Anglican prayer books is essentially identical with the modified form of this creed adopted by the second ecumenical council of Constantinople, 381 A.D., with the addition of "and of the Son," made at Toledo in 589.

Niceph'orus, name of several Byzantine emperors. **NICEPHORUS I**, d. 811; entered the army; became commander in chief; rebelled against Constantine VI; defeated and had his eyes put out; in popular insurrection against Empress Irene, 803, he was raised to the throne; fought Charlemagne and Haroun-al-Rashid; defeated by both and bought peace; invaded Bulgaria, where his whole army was destroyed and himself put to death. **NICEPHORUS II** (surnamed **PHOCAS**), d. 969; distinguished commander; married widow of Romanus II and assumed title of emperor abt. 963; gained several victories over the Saracens in Syria and Cilicia; assassinated by John Zimiscus. **NICEPHORUS III** (surnamed **BORONIATES**), d. 1081; intrepid and able general; revolted against Michael Ducas, 1078; caused himself to be proclaimed emperor in his place; attacked by partisans of Alexius Comnenus, and wishing to avert civil war, resigned crown and became a monk.

Nicephorus (surnamed **THE CONFESSOR**), 750-828; patriarch of Constantinople and historian; regarded as a saint; unwillingly appointed patriarch by Nicephorus I, 806; persecuted and deposed by Leo V, 815; wrote "Brief History of Constantinople from 602 to 770 A.D." a

"Chronology" from Adam to his own time, and treatises on the iconoclastic controversy.

Nich'olas I, d. 867; pope; b. Rome; succeeded Benedict III, 858; asserted authority with success against the metropolitan and the King of Lorraine, but controversy with Photius, patriarch of Constantinople, led to a schism between the Greek and Latin churches; succeeded by Adrian II.

Nicholas V (THOMAS OF SARZANA), 1398-1455; pope; b. Pisa; succeeded Eugenius IV, 1447; reorganized and enlarged the Vatican Library and Univ. of Rome; gathered in Rome great number of most celebrated scholars of the day; restored peace to the Western Church.

Nicholas I (NIKOLAI PAULOVITCH), 1796-1855; Czar of Russia; b. St. Petersburg; third son of Paul I; succeeded his brother Alexander I, 1825; carried on wars in central Asia, the Caucasus, Turkey, Poland, Hungary, and with the western powers; was a good administrator and a vigorous but intolerant ruler. For several years after 1849 Russia occupied the first place in the political system of Europe, and her plans with respect to Turkey were rapidly maturing when they received a sudden check from Napoleon III by the alliance between Great Britain, France, and Turkey, and the ensuing Crimean War.

Nicholas II, 1868- ; Czar of Russia; b. St. Petersburg; son of Alexander III; entered the army at eighteen; traveled extensively in the East, 1890-91, visiting Egypt, India, China, and Japan; also visited most of W. Europe; succeeded 1894; married Princess Alix of Hesse, granddaughter of Queen Victoria, the same year; chief events of reign: long and widespread internal revolution, accompanied by terrible massacres of Jews; initiation of International Peace Congress at The Hague, 1899 and 1907; disastrous war with Japan, 1904-5; establishment of first Russian Parliament by imperial manifesto, 1905. For details of events, see DOUMA.

Nicholas, Saint, d. abt. 340; Bishop of Myra; b. Patara, Syria; is the patron of sailors, merchants, travelers, and captives, and the guardian of children. Day, December 6th. In works of art he is represented with three children, or three purses, or three balls. Santa Claus is a Dutch corruption of his name.

Nich'ols, John, 1745-1826; English printer; b. Islington; apprentice and successor of William Bowyer; published "Literary Anecdotes of the Eighteenth Century," and with his son, John Bowyer Nichols, "Illustrations of Literary History." He was editor and publisher of the *Gentleman's Magazine*.

Nich'olson, Sir Francis, d. London, 1728; English colonial officer; Lieutenant (acting) Governor of New York for Andros, 1687-89; Governor of Virginia, 1690-92 and 1699-1705; Maryland, 1694-99; Nova Scotia, 1714-17; S. Carolina, 1721-25; commanded the Port Royal expedition, 1710; knighted, 1720; returned to England, 1720; became a lieutenant general, 1725.

Nicholson, James, 1737-1804; American naval officer; b. Chestertown, Md.; engaged in capture of Havana, 1762; took command, 1775, of the *Defense*, with which he recaptured several prizes from the British; appointed, June, 1776, to command of the *Virginia* (twenty-six guns), and, January, 1777, succeeded Com. Esek Hopkins as commander in chief of the Continental navy, and retained that post throughout the war; engaged with his crew as volunteers in the battle of Trenton; fought a severe but indecisive engagement with the British ship *Wyoming*, June 2, 1780, and was taken prisoner after a gallant resistance with his vessel, the *Trumbull* (thirty-eight guns), August, 1781, by the British vessels *Iris* and *General Monk*.

Nicias (nīsh'ī-ās), d. 413 B.C.; Athenian general; several times associated with Pericles in command, gaining a reputation for prudence and incorruptibility; in Peloponnesian war was distinguished rather for prudence than genius, but was almost always successful. In 415 he was sent with Alcibiades and Lamachus to Sicily. Alcibiades was soon recalled, Lamachus was slain before Syracuse, and Nicias continued the war, but with constantly failing fortunes. His superstition, excited by an eclipse of the moon, deterred him from retreating, and the Athenian fleet was destroyed and the army captured by the Syracusans. Nicias and Demosthenes were put to death, Eurymedon having fallen.

Nick'el, silver-white, malleable, and ductile metal, discovered by Cronstedt, 1751; symbol, Ni; atomic weight, 58.8; specific gravity, 8.279, increasing to 8.666 when forged. It is closely allied to iron and cobalt, and is associated with them in meteorites and many ores. The principal ore of nickel is the arsenide, to which the German miners gave the name of *Kupfernickel*, or false copper, because they tried in vain to extract copper from it; and it was in this mineral that Cronstedt first detected the metal. Among other ores of nickel are: (1) Pentlandite, sulphuret of iron and nickel, occurring in hornblende and gneiss; (2) nickel vitriol, a native sulphate, often found with kupfernickel in cobalt mines; (3) nickel glance, gersdorffite, or *weisses Nickelerz*, arsenio-sulphide of nickel, found with calcite, fluorspar, quartz, and quicksilver, and with decomposed galenite and blende. The metal also occurs in emerald nickel, found in chromic iron in Lancaster Co., Pa., and other places. Nickel is more tenacious than iron, and not much more fusible. It is magnetic at ordinary temperatures, but loses this property at 250° C., recovering it on cooling.

The principal alloys of nickel are: German silver, composed of copper 51, zinc 30.6, and nickel 18.4 parts in 100, and also in other proportions; *tiers-argent*, composed of two parts of nickel and one of silver; *packfong*, an alloy resembling German silver, brought from China nearly two hundred years ago, and composed of zinc 44, copper 16, and nickel 40 per cent; and *tutenag*, another Chinese alloy, containing zinc 37, copper 46, and nickel 17 per cent. Isaac Adams, of Boston, Mass., invented a

method of depositing nickel by means of a battery. He employed the double chloride of nickel and ammonium or sulphate of nickel and ammonium. From pure salts the layers of metal are deposited with great regularity and of sufficient thickness to admit of a fine polish. Nickel plating has become of great importance in the U. S. Nickel is used for magnetic needles, for philosophical and surgical instruments, and in watch movements. It also enters largely into coinage, alloyed with copper. In 1890 the Creusot works in France began experiments with nickel steel for armor plate, and, 1891, successful results were obtained with plates of U. S. manufacture. Nickel steel resists corrosion to a greater extent than ordinary carbon steel, its variation in size due to changes of temperature is slight, its hardness and toughness make it specially suitable for armor plate and railroad rails. As the total world's supply of nickel is less than 10,000 tons per annum, its commercial applications are necessarily limited.

Nicobar' Islands, group of twelve inhabited and seven uninhabited islands in the Indian Ocean, 125 m. NW. of Sumatra; area, 635 sq. m.; inhabitants belong to the Malayan race, in low state of civilization; islands very fertile, producing coconuts, sugar, rice, tobacco, bamboo, and oranges in abundance. Since 1869 they have belonged to Great Britain. Pop. (1901) 6,310.

Nicodemus, member of the Sanhedrim, mentioned thrice in the Gospel of John—iii, 1-21, as coming to Jesus by night; viii, 45, as demanding that Jesus should be heard before being judged; and xix, 38-42, as assisting Joseph of Arimathea in laying out the body of Christ.

Nicolai (nē'kō-II), **Christoph Friedrich**, 1733-1811; German critic and editor; b. Berlin; associated with Moses Mendelssohn in editing the "Library of Belles Lettres"; with Lessing on "Letters on Recent German Literature"; projected and edited for many years *The Universal German Library*; author of "Characteristic Anecdotes of Frederick II," "Life and Opinions of Sebalduß Nothanker," etc.; opposed the new schools of literature and philosophy, and incurred severe attacks by Herder, Goethe, Schiller, Lavater, and Fichte.

Nicola'itans, heretical sect of uncertain origin, alluded to in Rev. ii, 6, 15. According to Irenæus, they held fornication and the eating of meats which had been offered to idols not to be sinful.

Nicolaïeff, or **Nikolaïev** (nē-kō-lr'ēf), chief naval station of S. Russia and great grain emporium; on the Bug, 20 m. from its mouth, and 80 m. NE. from Odessa; is strongly defended and advantageously situated. Pop. (1897) 92,060.

Nic'olas, Sir **Nicholas Harris**, 1799-1848; English historian; b. E. Looe, Cornwall; served in the navy; studied law; called to the bar, 1825; joint editor of *The Retrospective Review*, 1826, and of the *Excerpta Historica*, 1831; chief works, "Synopsis of the Peerage of England," "History of the Battle of Agincourt,"

"The Chronology of History," "History of the Orders of Knighthood of the British Empire," "Dispatches and Letters of Lord Nelson."

Nicola'us of Damas'cus, Greek historian, intimate of Herod the Great, and tutor of the children of Antony and Cleopatra; wrote a "Universal History" in 144 books, important fragments of which have been preserved, together with portions of his biography of Augustus.

Nicole (nē-kōl'), **Pierre**, 1625-95; French moralist; b. Chartres; was a professor in the School of the Port Royalists, and shared in the writing of their schoolbooks and controversial works, and in their persecutions, and was obliged to leave Paris, 1677; fame rests on his "Moral Essays and Theological Instructions," 25 vols.

Nicoli'ni, Ernesto, 1834-98; French singer; b. Tours; made a successful operatic début in Paris as a lyric tenor; 1859, went to Italy, singing in various cities; 1866, sang in London, and again 1871; in the U. S. sang with Patti, to whom he was married, 1886, in Wales; afterwards rarely appeared in public.

Nicomede's, name of three kings of Bithynia, who follow: **NICOMEDES I**, d. abt. 250 B.C.; succeeded his father Zipoetes, 278; was the first of the Thracian dynasty who took the title of king; killed his three brothers; built a new capital on the site of Astacus, and called it Nicomedia. **NICOMEDES II** (surnamed **EPIPHANES**), d. abt. 90 B.C.; dethroned and killed his father, Prusias II, who had ordered his assassination, 149; made an alliance first with the Romans and afterwards with Mithridates; was deprived of Paphlagonia by the former; died of disappointment. **NICOMEDES III** (surnamed **PHILOPATAR**), d. 74 B.C.; last king of Bithynia; son and successor of the preceding; was twice deposed by Mithridates, and twice restored by the Romans, to whom he bequeathed his kingdom, having no children.

Nicomede'ia, capital of ancient Bithynia, at the head of the Sinus Astacenus; founded by Nicomedes I, 264 B.C., after the destruction of Astacus (SE. of it) by Lysimachus. From 202 to 330 A.D. it was the capital of the E. Roman Empire, and contained many splendid buildings. Arrian was born, Hannibal died, and Diocletian abdicated here. Constantine died at his Villa Ancyrona, close by. The modern Turkish town of Ismid occupies the old site.

Nicop'olia, name of ten ancient cities, one in Egypt, four in Asia, and five in Europe, each commemorating a victory; most important: (1) in Epirus, built by Augustus after the naval battle of Actium (31 B.C.); long a splendid city; after many vicissitudes was destroyed by the Bulgarians (1034); extensive ruins are 5 m. N. of Prevesa; heroic battle was fought here (October 3, 1798) by 760 French, Prevesans, and Suliotes against 7,000 soldiers of Ali Pasha of Yanina. (2) In Bulgaria on the Danube, probably ancient *Nicopolis ad Istrum*, founded by Trajan after the second Dacian war (106); Bayezid I here won a great battle

(1396) over the allied French, Hungarians, and Germans; European historians assert that 60,000 Ottomans were slain.

Nicot (nē-kō'), Jean (Sieur de Villemain), 1530-1600; French diplomatist; b. Nîmes; became ambassador to Portugal; introduced tobacco thence into France; botanical name *Nicotina* given in his honor.

Nidana (nē-dā'nā), one of the twelve links of the Buddhist chain of cause and effect which Gautama thought out under the Bo-tree during the third watch of the night in which he became Enlightened.

Niebuhr (nē'bōr), Barthold Georg, 1776-1831; Danish historian; b. Copenhagen; entered the civil service of Denmark, 1799; removed to Berlin, 1806, where he held various offices in the financial department of the Prussian Govt. Appointed historiographer to the King of Prussia, he delivered, 1810-11, a course of lectures on the history of Rome at the newly established Univ. of Berlin, and in this sphere his brilliant genius and immense learning at once found their proper application. In 1816-22 he was Prussian ambassador to the papal court, though in reality wholly occupied by scientific studies; and in the latter year removed to Bonn as professor at the university. Here he developed a great literary activity, but under the violent impression which the French Revolution (1830) made on him broke down mentally and physically. His fame rests chiefly on his great work, "History of Rome," which is, as far as it goes—to the first Punic War—a complete reconstruction of the history of Rome. The entire narrative of the founding of Rome, and the subsequent regal period, all of which had up to Niebuhr's time been accepted as authentic history, he discarded, after a thorough critical analysis, as purely legendary.

Niebuhr, Karsten, 1733-1815; German traveler; b. Lüdingworth, Lauenburg; was employed by the Danish Govt., 1760-67, in exploring Arabia, Persia, and neighboring countries for information bearing on New Testament history and geography; though all his companions perished, he continued his travels for several years; published "Description of Arabia," "Travels in Arabia and the Surrounding Countries," "Flora Egyptiaco-Arabica," "Descriptions of Animals," etc.

Niel (nē-ēl'), Adolphe, 1802-69; French marshal; b. Muret; gained distinction in Algeria and as a military engineer in France; became general of division, 1853; was employed in the sieges of Bomarsund and Sebastopol, 1854-55; decided by the artillery under his command the victory of Solferino (June 24, 1859), and was made a marshal; from 1867 was Minister of War.

Niello (nī-ēl'lo) Work, ornamental work in which plates of metal are engraved with ornamental figures, the lines of which are then filled with a black alloy and the whole burnished. Door plates, in which the depressions are filled with wax or varnish, are a commercial form of niello work. The art is practiced in Russia, and to a certain extent by the silversmiths of

W. Europe and the U. S. Some of the earliest and best niellos are Byzantine; the most celebrated are Italian.

Niemcewicz (nyēm-tsē'vich), Julian Ursin, 1757-1841; Polish author; b. Skoki; member of the Diet, 1788-92; fought by the side of Kosciuszko, 1794; shared his imprisonment in Russia; accompanied him to America; after fall of Warsaw, 1831, lived in Paris; his "Historical Songs of the Poles" attained immense popularity; wrote tales and fables in the style of Lafontaine, novels, and other works.

Nie'men, river of Prussia and W. Russia; rises a few miles S. of city of Minsk; becomes navigable at Grodno; divides at Winge into the Russ and the Gilge, both of which fall into the Kurisches-Haff; is 500 m. long.

Niemeyer (nē'mī-ēr), August Hermann, 1754-1828; German theologian; b. Halle; became director of charitable institutions and chancellor and perpetual rector of the Univ. of Halle; works include "Characteristics of the Bible," "Principles of Education," "Handbook of Religion."

Niepcé (nē-ēps'), Joseph Nicéphore, 1765-1833; French chemist; b. Châlon-sur-Saône; was civil administrator of Nice, 1795-1801; afterwards devoted himself to mechanics and chemistry; began to make "heliographic researches" for fixing images on metallic plates by the agency of light, 1813, and, 1824, partially succeeded in producing pictures, first on tin and polished glass, then on copper, and finally on silver. In 1829 he formed a partnership with Daguerre to improve the discovery of photography, which, according to the terms of agreement, had been made by Niepcé; but the latter died before it was perfected.

Niepcé de Saint Victor (dē sān vèk-tōr'), Claude Marie François, 1805-70; French chemist; b. near Châlon-sur-Saône; nephew of the preceding; perfected his uncle's photographic process, reproducing designs by the use of vapors of iodine, and obtaining images on glass plates coated with a film of starch, gelatin, or albumen; also made experiments in photographing colors, and succeeded in producing accurate representations of various colored objects, but was unable to fix the tints; published "Recherches Photographiques," including a description of his process of heliography.

Nietzsche (nētz'shē), Friedrich Wilhelm, 1844-1900; philosopher; b. near Lutzen, Saxony; educated at Bonn and Leipzig; Prof. of Classical Philosophy at Basel, 1869-79; was forced by ill health to retire in 1879; was declared insane in 1888. He was a brilliant writer on philosophical subjects, but he developed no system and no body of sustained thought. He was an atheist, and protested against the teaching of Christianity. He believed that the survival of the fittest was the survival of the strongest, who had no consideration for the weak. English versions of his works include: "Thus Spake Zarathustra," "The Genealogy of Mortality," "The Fall of Wagner," "The Twilight of the Gods," "Anti-christ."

Ni'ger, third largest river in Africa, in respect of its length and the size of its basin; drains an area of about 1,150,000 sq. m.; is formed by the junction of three little rivers, in about 8° 20' N. lat. and 10° W. lon., and is known to most of the natives in its upper course as the Joliba, and in its middle and lower courses as the Quorra; is 2,500 m. long, and notable by two facts: (1) Its delta, which begins 100 m. from the sea, is the largest in Africa, the mouths of its outermost branches being 200 m. apart, the whole including 14,000 sq. m. of low alluvial plain covered with forest and jungle. (2) The Niger is the only river in Africa which affords uninterrupted steam navigation between the sea and the heart of the continent.

Nige'ria, formerly NIGER TERRITORIES, extensive region in British W. Africa, of which about nine tenths was within the territories of the Royal Niger Company (founded 1882, chartered 1886) till 1900, when the company surrendered its charter, and its possessions, with other tracts acquired in the meantime, were transferred to imperial administration. The whole area is estimated at 333,600 sq. m.; pop. abt. 20,000,000. The region is now divided into N. Nigeria, the largest tract, and S. Nigeria, with which the former protectorate of Lagos was incorporated, 1906. N. Nigeria is divided into seventeen provinces; administrative and military headquarters at Zungeru; chief towns, Wurno, Gando, Sokoto, Kano, Bida, Yola, Yakuba, Zaria, and Illorin; products cotton, indigo, rubber, hides, and ivory; Mohammedanism widely diffused; paganism predominant in parts; Protestant missionary societies have established industrial and other schools at several stations; division includes old Fulah empire, of which Sultan of Sokoto is head. S. Nigeria has congeries of pagan tribes, most important being the Ibos, Ijos, Jakri, Beni, Efiko, Quas, and Yorubos; seat of

government, Calabar; chief ports, Wari, Burutu, Forcados, Safele, Akassa, Brass, Degama, Bonny, Opobo, Egwanga, and Old Calabar; products: palm kernels and oil, rubber, gums, ivory, and coffee. At time of writing all Nigeria was undergoing reorganization according to modern methods of government.

Night Hawk, name applied in N. America to birds of the genus *Chordeiles*, belong-

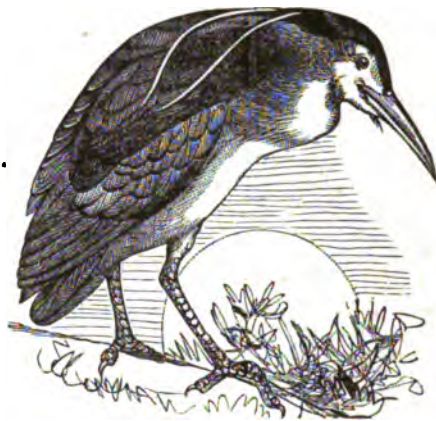
ing to the family *Caprimulgidae*, or goatsuckers. They are sometimes confounded with the whip-poor-will, from which they may be readily distinguished by their forked tails and absence of



NIGHT HAWK.

bristles about the mouth. The common species, *O. virginianus*, is abundant in E. N. America, and there are two subspecies, one in Florida and one in the Southwest. The Texan night hawk (*O. texensis*), found also in the Southwest, is smaller and lighter colored.

Night Heron, popular name for several species of herons belonging to the genus *Nycticorax*, distinguished from other herons by stouter bills and shorter legs and necks. The most common species is *N. nycticorax*, which is



NIGHT HERON.

found in both Europe and N. America; is about 2 ft. in length, and when adult of a light ashy color; has two long, slender white plumes hanging from the head. *N. violaceus* of the S. U. S. is a rarer and somewhat handsomer bird.

Night'ingale, Florence, 1820-1910; English benefactor; b. Florence, Italy, of wealthy parents; studied systems of nursing and hospital management in France and Germany; superin-



NIGHTINGALE.

tendent of corps of female nurses sent by the British War Department to the Crimean War; organized a hospital at Scutari; later in charge of all hospitals on the Bosphorus; devoted testimonial of £50,000 subscribed for her to found-

ing a training school for nurses; publications, "Notes on Hospitals," "Notes on Nursing," "On the Sanitary State of the Army in India," "Notes on Lying-in Institutions," "Life or Death in India," etc.

Nightingale, small and inconspicuous member of the family *Sylviidae*, famed for its song, heard not only at night, but during the day as well; is about the size of a bluebird; reddish brown above, grayish white below; common throughout a great part of Europe; ranges E. into Persia, and occurs in N. Africa; also visits England, where its song may be heard from April to June. The Persian nightingale is said to be the bulbul of the poets, but that name is now generally applied to birds of the genus *Pycnonotus*, members of another family, the *Icidae*.

Night'mare, terrific dream in which there appears to be a disagreeable object, as a person, animal, or goblin, present and often upon the breast of the sleeper, accompanied by the inability to cry out, move, or call for help. Some patients have merely a sense of terror, oppression, and inability to call, without any dream. It is ascribable to heart disease or asthma, or to obstruction in the circulation caused by the pressure of food in the alimentary canal, especially when the sleeper lies upon his back. Many of the symptoms of nightmare may occur to nervous and anxious patients in a half-wakeful state just after going to bed. The careful voluntary suspension of the effort to think will usually prevent these attacks, which seem to be due to the performance of the function of thinking at a time when the supply of blood to the brain is deficient. The ancients believed that devils and witches were present during an attack of nightmare. They affirmed that the evil spirits which placed themselves upon the patient were males, called incubi, while female spirits and witches, succubi, were thought to lie beneath the sleeping sufferer. See DREAM.



NIGHTSHADE.

Night'shade Fam'ily, *Solanaceæ*, a group of gamopetalous dicotyledons, numbering 1,500 species, mostly natives of the warm climates.

They are nearly all herbs or small shrubs, a few only being trees. The potato, tomato, and tobacco are members of this family, as are also the species of *Petunia*, *Datura*, *Cestrum*, *Lycium*, etc., many of which are familiar ornamental plants.

Nightshade, Woody. See BITTERSWEET.

Nigid'ius Fig'ulus, Publius, d. 45 B.C.; Latin grammarian; prætor 58 B.C.; as a follower of Pompey banished by Cæsar, he died in exile; next to Varro, was the most learned man of his time; treated not only grammar, but also subjects connected with natural science and religion.

Ni'hilism, philosophy of universal negation; name given to the tenets of the extreme section of Russian revolutionists; partisans of universal destruction, without having any positive constructive element in their programme. The term was invented by the novelist Ivan Turgeneff, and appears for the first time in his novel "Fathers and Children." It is used as a nickname of the hero, *Bazaroff*, who impersonates a movement which came into existence during the epoch of the emancipation of the serfs (1861), and which, since the appearance of Turgeneff's novel, has been known in Russia under the name of nihilism. Primitive and genuine nihilism was a school of philosophical and ethical individualism which flourished in Russia 1855-65, and is now extinct. It had no political aspect, however, and was by its very nature opposed to political action. Gradually, however, the individualistic nihilism was transformed into a political and social movement, the results of the economic shortcomings of the Emancipation Act of 1861 contributing largely to this change.

The international socialists divided into two parties. The Social Democrats advocated the abolition of private property in the instruments of labor and their collective ownership by the workmen; but they wished to preserve existing political organizations, which should be made an instrument with which to rebuild the economic structure of the community. Peaceful electoral agitation was their chief weapon. The anarchists advocated the total abolition of the state and the substitution for it of a series of small, absolutely independent, and freely constituted communes. Of these two doctrines, the latter had by far the greater fascination for the Russian socialists of 1870. Nothing was expected and nothing was asked from the educated classes and the liberal opposition, which was in favor of a constitutional government for Russia. The socialists of this epoch based all their hopes on the peasants. In 1878 terrorism was accepted as a system of warfare by the Russian revolutionists.

In 1880 the most energetic and numerous section of the revolutionists proclaimed that the aim of their attacks on the government was the obtaining of a constitution for Russia. This was the *Narodnai Volia* party, with the "executive committee" at its head, which is the embodiment of nihilism as understood abroad, and in 1880 thus formulated its programme of reforms: 1. A permanent representative assembly, having supreme control and direction in all

general state affairs. 2. Provincial self-government, secured by the election of all public functionaries. 3. Independence of the village commune as an economic and administrative unit. 4. Complete liberty of conscience, speech, press, meetings, association, and electoral agitation. 5. Manhood suffrage. 6. Substitution of the standing army by a territorial militia. 7. Nationalization of land. 8. A series of measures tending to transfer the possession of factories to workmen.

There were two ways in which the nihilists tried to carry out their campaign against the autocracy. The first was that of direct attempts against the representatives of autocracy. The second was the organizing of military insurrections, which did not take place; the police succeeded in discovering the plots before they were matured. See ANARCHISTS; DOUMA.

Niigata (nē-ē-gā'tā), city of Japan; on the W. coast of the main island, at the mouth of the Shinanogawa; is built on a narrow strip of land between the river and the ocean, which is barred from view by high sand hills; opened to foreign trade, 1869; nominally a treaty port and the residence of foreign consuls, but has virtually no foreign trade. The bar at the mouth of the river prevents vessels of foreign build from entering, and the open roadstead is unsafe. Pop. (1903) 59,576.

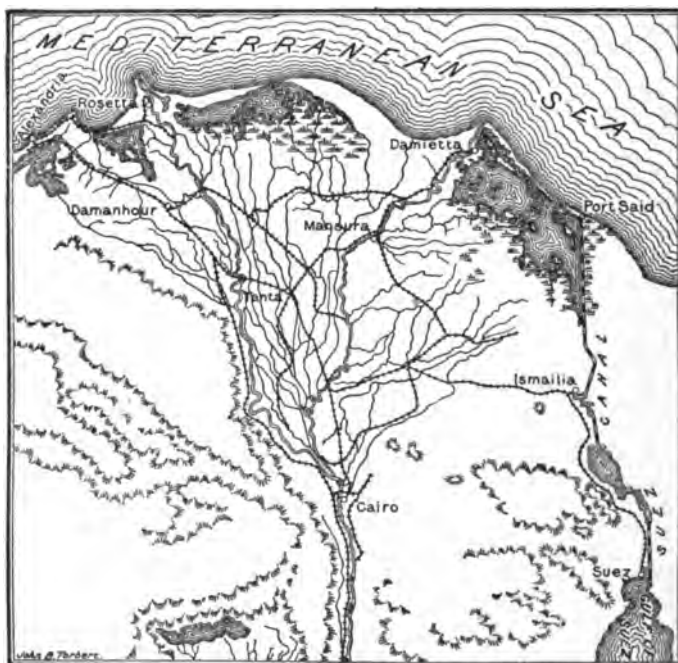
Nijni Novgorod (nig'nē nōv-gō'rōd). See NIZHNI NOVGOROD.

Nikisch (nē'k'ish), Arthur, 1855- ; Hungarian conductor; b. Szent-Miklós; after distinguished career in Europe was conductor of Boston Symphony Orchestra, 1889-93; director of Royal Opera and conductor of Philharmonic concerts at Pest, 1893-95; conductor of Gewandhaus concerts at Leipzig and Philharmonic concerts at Berlin after 1895.

Nikko (nēk'kō), village of Japan, about 80 m. N. of Tokyo; at the base of the great range of mountains of which Nantai-san is the chief. Here are situated the finest temples in the empire. Always associated with religious edifices, Nikko became of first importance as a religious resort on the death of Iyeyasu, whose mausoleum was erected on the S. slope of a hill called Hotoke Iwa. A long and magnificent avenue of cryptomerias leads up to Nikko, and its temples are marvels of elegance and beauty. Noteworthy sights are the red-lacquered bridge, crossed only by the emperor, and several fine waterfalls.

Nile, probably the longest and most celebrated river in the world, and the most remarkable of the four great streams of Africa. It flows from the equatorial regions along and inside the E. axis of the continent, and after a course of 4,300 m. (estimated) reaches the Mediterranean in 31° 30' N. lat. by two principal mouths, forming a delta, which begins near Cairo, 100 m. from the sea, and extends 150 m. along the shores. The upper half of the Nile drains vast tropical regions abundantly watered and receives many tributaries; the lower or N. half traverses the rainless portion of the great desert regions, where its valley, bordered by bare, rocky bluffs, appears like a band of verdure in the midst of this desolate country.

The basin of the Nile is about 1,500,000 sq. m.,



NILE DELTA.

or half the size of the U. S., exclusive of Alaska. For centuries from 200 B.C. the ancient geographers declared that the river rose far S. in great lakes whose position was approximately given by Ptolemy. Their information was discredited by later geographers, and the source of the Nile was the greatest geographical problem until it was solved by several explorers, chief among whom were Speke, the discoverer of Victoria Nyanza, and Baker and Stanley, who revealed lakes Albert Nyanza and Albert Edward, respectively. The ultimate headwaters are not yet definitely determined.

The main fact is that the Nile proceeds from three lakes lying on high plateaus under the equator—Victoria Nyanza (3,800 ft.), Albert Edward (2,850 ft.), and Albert Nyanza (2,300 ft.). The true Nile issues from the N. end of the former as a powerful and rapid stream flow-

ing toward the NW. into Albert Nyanza, where it is joined by the waters received from Albert Edward. Thence it runs with rapid course, and leaves the plateau regions to enter the great plains of the Egyptian Sudan. Here it receives from the W. the waters of a vast network of rivers collected by the Bhar-el-Arab and the Bhar-el-Gazal, and those of the E. plateaus through the Sobat. After the junction of these rivers, under the name of Bhar-el-Abiad, or White Nile, it follows again a course between the table-lands of Kordofan and the plains of Sennaar to Khartum, where the Blue Nile, or Bahr-el-Azrek, brings to it the united waters of the Abyssinian plateau and its snowy mountains. Lower down another powerful stream, the Athara, or Black Nile, pours in the waters of N. Abyssinia. From this point to the Mediterranean, along its course of nearly 1,500 m., it receives not a single tributary of importance. Thence making a great bend, it forms a series of rapids, the so-called cataracts of the Nile, the last of which is at Assuan, at its entrance into Egypt.

Nilgau, or **Nylghau** (nil'gā), large antelope (*Portax tragocamelus*) found in India, inhabiting the jungles but apparently preferring the vicinity of cultivated land. It is at times very wild, courageous, and resolute, but ordinarily falls an easy victim to the spear or rifle of the hunter. It has never been thoroughly tamed.

Nil'sson, Christine, 1843—; Swedish soprano; b. near Wexio, of a peasant family; attracted attention, while singing in the streets, of Count Tornerhjelm, who aided her in acquiring a thorough musical education; made her début in Paris in "La Traviata," 1864; in London, in both opera and oratorio, 1867; in New York City in concert, 1870, and opera, 1871; made several highly successful tours of American and European cities; married, 1872, M. Rouzaud (d. 1882), and, 1887, Count de Miranda (d. 1902); retired after second marriage; favorite rôles, *Mignon*, *Elsa*, and *Margherita*.

Nilsson, Sven, 1787-1887; Swedish archaeologist; b. Skaane; was Prof. of Natural History in the Univ. of Lund, 1832-56; became widely known as a high authority in zoölogy and paleontology. His most important zoölogical work is his "Skandinavien Fauna," in four volumes. A fifth volume of "Illuminated Figures of the Scandinavian Fauna" properly belongs to the set, and the whole constitutes a monumental work. In his later years he devoted himself almost exclusively to Scandinavian antiquities, and by his celebrated work "Skandinaviska Nordens Ur-invännare" became one of the founders of the science of archaeology.

Nimeguen (nim'ā-gēn), Dutch, **NIJMEGEN**; German, **NIMWEGEN**; town of the Netherlands, province of Gelderland; on the Waal; 73 m. E. of Rotterdam; is important on account of its commanding position on the Rhine and Waal; has manufactures of beer, brandy, eau de cologne, tobacco, and cigars. Treaties of peace were concluded here between Holland and France (August 11, 1678), Holland and Spain (September 17, 1678), and between France

and Germany (February 5, 1679). Pop. (1907) 53,213.

Nîmes (nēm), capital of department of Gard, France; 62 m. NW. of Marseilles; is the see of a bishop, has many excellent educational institutions, and its manufactures of cottons, lace, hosiery, brandy, and especially of silks, are very important. The architectural monuments which the city contains from the Roman period are of the highest interest. The Romans occupied the city 121 B.C., and during the first emperors it was a magnificent city. Subsequently it suffered much from the Visigoths, Saracens, and Normans, and in the fourteenth century it was nearly deserted. Under Francis I it rose again, and although it suffered much by the Revocation of the Edict of Nantes and during the revolution, it is very prosperous. Pop. (1906) 80,184.

Nim'rod, son of Cush and grandson of Ham (Gen. x); characterized as "a mighty hunter before the Lord"; founded an empire in Shinar or Babylonia. "Out of that land he went forth to Assyria," as the words are properly rendered, "and builded Nineveh." Arab tradition ascribes many great works to him, especially Birs Nimrud, near Babylon, and the mound Nimrud, near Nineveh.

Nim'rud, modern Arabic name of the ruins which represent the ancient Assyrian city Calah; on the E. side of the Tigris, about 20 m. SE. of Mosul and 7 m. above the mouth of the upper Zab. Calah was built by Shalmaneser I about 1320 B.C., and was, after Aashur and Nineveh, the third Assyrian capital. After the rise of Calah the three cities flourished contemporaneously, certain of the kings having palaces in more than one of them. When Assurnazir-pal (884-860) ascended the throne he found Calah in ruins and Assyria in a weak condition. A great warrior, he restored the military power of the nation and rebuilt the city. Here resided likewise his son, Shalmaneser II (860-824), and his great-grandson, Ramman-nirari III (811-782). Of later kings who adorned Calah may be mentioned Tiglath-pileser III (745-727), Sargon (722-705), and Esarhaddon (681-668). With the accession of the Sargon dynasty the importance of Calah began to decline. The ruins are about 1½ m. from the Tigris, and were first excavated by Sir Austen Henry Layard, 1845-47.

George Smith enumerates the buildings as follows: (1) A tower on the NW. corner of the mound, faced with stone to the height of 20 ft., 167 ft. 6 in. each way, built by Shalmaneser II. (2) Temples around the tower built by Assurnazir-pal. (3) The NW. palace (S. of the tower), about 350 ft. square, built by Assurnazir-pal, repaired by Sargon. (4) The center palace (S. of the NW. palace), built by Shalmaneser II, added to by Ramman-nirari III, dismantled by Tiglath-pileser III, who rebuilt it; destroyed by Esarhaddon. (5) The SW. palace (S. of the center palace), built by Esarhaddon out of materials of the NW. and center palaces. (6) The SE. palace (E. of the SW. palace), built by Shalmaneser II. (7) Temple of Nebo (N. of the SE. palace), built by Ramman-nirari III.

Nin'evēh, most celebrated city of the Assyrians. Classical tradition ascribes the founding of the city to Ninus and his wife Semiramis, but this is incorrect. Ninus seems to be a mythical personage. The name Semiramis has, with probable correctness, been identified with Sammuramat, the name of the wife of Ramman-nirari III (811-782), but Nineveh had existed for many centuries before the time of Sammuramat. The name of the city resembles the Assyrian word for fish (*nānu*), and some persons seek a connection between the two. Others claim that it was formed from the name of an Assyrian deity, Nin. According to Schrader, it signified "abode," corresponding to the Hebrew *naveh*. Long before the time of Alexander it was completely destroyed. Huge mounds, apparently of mere earth and rubbish, covered its site, the most important of which are now known as the mounds of Nimrud, of Koyunjik, of Selamiyeh, of Nebi Yunus or the prophet Jonah, of Keremlis, about 15 m. NE. of Nimrud, and of Khorsabad, 12 m. NE. of Mosul. The first accurate description and plan of these ruins was given by C. J. Rich, the English East India Company's political agent at Bagdad, who surveyed them, 1820, and collected a few specimens of pottery and brick inscribed with cuneiform characters. In 1843 M. Botta, French Consul at Mosul, laid bare at Khorsabad the ruins of a magnificent palace, evidently destroyed by fire. He found apartments paneled with slabs of coarse gray alabaster, on which were sculptured in bas-relief figures of men and animals, with cuneiform inscriptions. In 1845 Mr. Layard began excavations at Nimrud, which were continued till April, 1847. He discovered immense quantities of sculptures, inscriptions, pottery, and antiquities of all sorts. Excavations, with like results, were also made in the mounds of Koyunjik and Nebi Yunus. In the latter part of 1849, at the expense of the British Museum, Mr. Layard resumed his explorations and continued them for about a year.

The history of the city is intimately connected with that of Assyria. Here was the royal residence during most of the best-known period of Assyrian history. The beginnings of Nineveh antedate our knowledge. A temple to Ishtar, at all periods the favorite deity of the city, existed there in the nineteenth century B.C. The library of Assurbanipal furnishes a copy of a hymn addressed to Ishtar of Nineveh, the original of which seems to have come from the eighteenth or nineteenth century B.C. The tradition of the site of Nineveh has survived until to-day. The ruins lie on the Tigris, E. of Mosul. The river touches the inclosure now only at the NW. and SW. angles. The inclosure has four sides of unequal length. It is about 3 m. long (NE. to SW.), while its greatest breadth is a little less than 1½ m., in the N. portion, and its least breadth about three fifths of a mile, at the S. end. The surrounding parks and villages may formerly have been reckoned as a part of the city. In Jonah Nineveh is spoken of as a "great city" "of three days' journey." The ruined wall and moat are still distinct. The E. side is, furthermore, defended by several outer lines of embankment. The Khazar River flows through the city from the

E., dividing it into two nearly equal portions, and emptying into the Tigris.

Ningpo', city of China; province of Chekiang; on the Takia or Ningpo River, near its mouth in the harbor of Chusan, 125 m. S. of Shanghai; is surrounded by a wall about 5 m. in circumference, with six gates. The streets are broad, and the town is intersected by canals and connected with its suburbs by a bridge of boats. Vessels of about 300 tons can come up to the town. Ningpo is one of the five ports opened to general intercourse by treaty, 1842. Its gold- and silversmiths are noted for the delicacy and tastefulness of their work, and its confectionery is celebrated all over China. The specialty of the place, however, is its elegantly carved and inlaid furniture. Silk culture is extensively carried on in the surrounding country, and silk weaving is an important industry. Pop. (1907) est. at 260,000.

Niño (nēn'yō), **Pedro Alonso**, 1455-1505; Spanish navigator; b. Moguer, Spain; companion of Columbus on his third voyage; later conducted explorations along the coast of S. America; returned with immense riches in gold and pearls, much of which was confiscated by the government.

Nio (nē'ō), ancient *Ios*, island of the Ægean; now, but not anciently, reckoned one of the Cyclades; lies N. of Theara and SW. of Naxos; is 11 m. long and 5 broad; area, 20 sq. m.; is rough, but quite productive, and has a fine harbor. Pop. abt. 2,000.

Niobe (ni'ō-bē), in Greek mythology, a daughter of Tantalus, King of Lydia, by a nymph, and wife of Amphion. She had six sons and six daughters, and as she boasted herself superior to Latona, who had borne only two children, Apollo and Diana slew all the children of Niobe, who wept herself to stone.

Nio'bium, or **Colum'bium**, a rare metal originally discovered in columbite from Massachusetts by Hatchett in 1801. Wollaston in 1809 expressed the belief that the metal was identical with tantalum, and this view was generally accepted until 1846, when H. Rose showed that the two were distinct. He inclined to the belief that what had been described as columbium really consisted of two metals, which he called niobium and pelopium. Further investigations showed him that but one metal was the basis of the supposed two; so the name pelopium was dropped and the name niobium was retained, the symbol Nb being now used for columbium. With tantalum, columbium forms a group distinct from the other elements. The principal minerals in which columbium is found are columbite, bragite, samarskite, pyrochlore, and aeschynite. Some of these minerals contain tungsten. They are found in small quantities in a few localities in Europe and the U. S. The atomic weight of columbium is 94.

Niobrara (ni'ō-brā'rā) Riv'er, tributary of the Missouri; rises in Laramie Co., Wyo., and flows 450 m. to the E., through N. Nebraska, in its lower course separating S. Dakota from Nebraska; shallow and very rapid; upper val-

ley treeless pasture land; traverses the Great Sandhill region, believed to be almost valueless; flows through a rocky region with fertile, well-timbered ravines, and its lower valley has good farming land, with abundant trees.

Nip'igon, or **Nepigon**, a lake, a river, and a bay, tributary on the N. to Lake Superior. The lake, 70 m. long from N. to S. and 45 m. wide from E. to W., is so indented by bays that its shores are nearly 600 m. in extent. It is studded with islands and celebrated for its fish. It lies about 25 m. N. of Lake Superior.

Nip'issing, or **Nepissing**, lake of Ontario, Canada; nearly midway between Lake Huron and the Ottawa River; shape irregular; shores bold; length, 50 m.; extreme width, 35; contains many islands; discharges through French River into Georgian Bay (Lake Huron).

Nip'pon, name improperly given by Europeans to the principal island of the Japanese Empire. The Japanese call the whole empire Dai Nippon, but had no separate name for the main island till 1873, when in a military geography published by the war department it was called Hondo; now Honshiu. Pop. (1904) 35,459,993. See JAPAN.

Nippur (nīp-pōr'), ancient city of Babylonia; between the Euphrates and Tigris rivers; 50 m. SE. of Babylon; site now called Niffer; was partly excavated by Sir Austen H. Layard; very thoroughly, 1888-95, by expedition sent out by the Univ. of Pennsylvania, under the direction of Rev. Dr. John P. Peters, which secured many valuable inscriptions and other objects, divided between the Imperial Museum at Constantinople and the University Museum, and made discoveries of great historic interest.

Nirvana (nīr-vā'nā), Sanskrit "extinguishment," highest aim and the highest good of the Buddhist saint; the blissful condition of those who by the removal of ignorance and the extinction of desire have arrived at a point where rebirth is no longer necessary and the misery and sorrow incident to life are at an end. This is accomplished by walking in the Noble Eightfold Path.

Nisard (nē-zār'), Jean Marie Napoléon Désiré, 1806-88; French literary historian; b. Chatillon-sur-Seine; held important offices in Ministry of Education; Prof. Latin Eloquence in Collège de France, later of French Eloquence; director superior normal schools, 1857-67; noted for his opposition to prevailing literature and his controversy concerning it with Jules Janin; works include "Studies of Morals and Criticism on the Latin Poets during the Decline of Learning," "History of French Literature," "Studies on the Revival of Letters," "Studies in Critical Literature," "The Four Great Roman Historians," etc.

Nish, **Nisch** (nēsh), or **Nissa** (nēs'sā), second largest city of Servia; the ancient Naissus; on the Nissava, 115 m. SE. of Belgrade; always an important military center, now the S. key of Servia; scene of formal mustering of Ottoman armies before a European war. Pop. (1906) 21,946.

Nishapur', town in province of Khorassan, Persia; on the Seka; 53 m. W. of Meshed; surrounded with walls and ditches; poorly built and partly in ruins; at an elevation of 4,200 ft. The Greeks, who called it Nicaya and Nicæa, believed it to be the birthplace of the god Gionysos. Pop. abt. 10,000.

Ni'si Pri'us (Latin, "unless before"), law term signifying, both in England and the U. S., a trial court held by one judge, or less than the full bench, usually with a jury. Anciently, in England nearly all important actions were begun before the courts of Westminster; but the burden of going to London for the trial ultimately became so great that some centuries ago the practice arose of beginning a case at Westminster as the law required, and continuing it from term to term "unless before" the next term a court which could try it should sit in the county where the cause of action arose or existed. The words *nisi prius* in the Latin record gave the name to the whole procedure, and came to be applied to the courts of assize at which the cause was sure to be tried.

Nito'cris, Egyptian queen; last ruler of the sixth dynasty; reigned seven years; name found in the royal list of the Turin papyrus, but on no monuments; information comes mainly from Herodotus (ii, 100). She is said to have received the throne after the murder of her brother by conspirators, who afterwards made her regent. Her brother's death she avenged by drowning those implicated in the plot in a large subterranean chamber into which they were invited to partake of a feast of inauguration. To escape retribution she took her own life. She is also said to have built the third largest pyramid, but she appears rather to have enlarged and faced with granite the pyramid of Mycerinos of the fourth dynasty, in which it is believed that her funeral chamber was located.

Ni'tre. See SALTPETRE.

Ni'tric Ac'id, one of the compounds which nitrogen forms with oxygen and hydrogen. So far as known, nitric acid was first prepared by the Arabian chemist Geber (probably in the ninth century A.D.) by distilling a mixture of niter or saltpeter, cyprian vitriol (sulphate of copper), and alum. He called it *aqua dissolutiva*. Later it was prepared by other methods and called *aqua fortis*, *spiritus nitri acidus*, and *acidum nitri*. Glauber first showed that the acid can be most easily made by treating saltpeter with sulphuric acid. Lavoisier discovered that nitric acid contains oxygen, and later showed that it contains nitrogen. Nitric acid occurs in nature in combination as salts called nitrates. The ammonium, potassium, and sodium salts are widely distributed over the earth's surface, and in a few places nitrates are found in large quantities. Small quantities of nitrates occur in the air and in all bodies of natural water. From the soil the nitrates pass into the plants. Nitrates are formed wherever organic substances containing nitrogen, especially refuse animal matter, undergo decomposition in the soil in contact with alkali.

line bases or their carbonates. This conversion is of great importance in nature, and it has been the subject of much investigation. It was first thought that *nitrification*, as the process is called, was due simply to the action of oxygen, but it is now known that it is caused by bacterial action.

Nitric acid is made from either potassium nitrate (*saltpeter*) or sodium nitrate (*Chili saltpeter* or *cubic niter*) by treating with sulphuric acid. At the same time, in case potassium nitrate is used, either potassium sulphate or acid potassium sulphate (bisulphate of potash) is formed, or both may be formed according to the proportion of sulphuric acid used. The acid obtained by this process is not pure, but contains water and other compounds of nitrogen which are formed by the action of heat in the acid, and it is always more or less colored. The nitrates from which nitric acid is made always contain other substances, especially chlorides, and the acid itself is therefore impure. Pure nitric acid is made from the commercial product by distilling it again. Pure nitric acid is a limpid, fuming, colorless, powerfully corrosive liquid, having a specific gravity of 1.53 at 59°, of 1.559 at 32°, freezing at - 67° F., and boiling at 187°. The boiling point from its commencement rises, owing to decomposition, until it reaches 250°, at which point the distillation goes on.

Nitrites, salts produced by the union of nitrous acid with bases. The principal metallic salts are those of potassium, sodium, barium, ammonium, copper, lead, and nickel. They are usually prepared by reducing the nitrates. Nitrites are formed in nature by the decomposition of organic matter, and when found in water indicate sewage contamination. The principal alcoholic nitrites are those of amyl, ethyl, methyl, and butyl. The nitrite of amyl is an inflammable liquid, of a fruity, pearlike odor, reddish-yellow color, and specific gravity 0.877, boiling at 196°. When inhaled it is a powerful stimulant to the heart, the excitement being followed by greatly diminished power of the organ, contraction of the external vessels, and suspension of respiration; but the effect may be stopped short of death, the result being a state resembling trance. Nitrite of ethyl, or nitrous ether, is a yellowish liquid, having the odor of apples, sparingly soluble in water, but perfectly so in all proportions in alcohol. It boils at 62°; specific gravity 0.947. The sweet spirits of niter of pharmacy is a solution of nitrous ether, aldehyde, and several other substances, prepared by distilling 3 lb. of alcohol with 4 lb. of nitric acid. Nitrite of methyl, specific gravity 0.991, boils at 11° F. Its smell resembles that of nitrous ether.

Nitroben'zene, Nitroben'zol, or Es'sence of Mir'bane, heavy yellow liquid; discovered, 1834; produced by treating benzene with strong nitric acid. On mixing the two liquids they become warm, assume a brown color, and soon emit red fumes and boil. The color becomes finally orange. On adding water the nitrobenzene separates and settles to the bottom of the vessel. A mixture of sulphuric acid and nitrate of soda is preferred to nitric acid. It has an

odor like that of bitter almonds, whence it is often called improperly artificial oil of bitter almonds. It is used as a perfume for soap.

Nitrocellulose, general term for the product resulting from the treatment of cellulose, cotton, wood fiber, etc., with a mixture of strong nitric and sulphuric acids, whereby one or more atoms of hydrogen are replaced by an equal number of molecules of nitryl. Several varieties are known, including the trinitrocellulose used as an explosive and the gun cotton used for making collodion.

Nitroge'l'atin. See EXPLOSIVES.

Nitrogen, chemical element, from 79.1 to 79.2 per cent, by volume, of the atmosphere of the earth; is also found, in small but essential proportion, in the bodies of all animals and plants, and in those constituents of the solid earth which are formed from their remains, such as coal. In the earth and waters it occurs also, though in relatively minute proportion, in the form of nitrates and of ammonia. Before 1772 air was considered homogeneous and elementary, being convertible by continued respiration wholly into carbonic acid, then called "fixed air." At that date, however—which was two years previous to the discovery of oxygen by Priestley—the English chemist, Rutherford, discovered that, after separating from air that had been repeatedly breathed all its carbonic acid, a peculiar irrespirable gas was left. Soon afterwards Scheele and Lavoisier discovered that air consists of this gas and oxygen, and that it remains behind after the oxygen is removed. Nitrogen enters into the composition of many bodies. It is an essential constituent of many valuable and powerful medicines, such as quinine and morphine, and dangerous poisons, such as cyanogen and its compounds and strychnine. It is an important constituent of those tissues and fluids of plants and animals which contain albumen and fibrine, commonly known as nitrogenous tissues.

The most important inorganic compounds are with hydrogen, forming ammonia; with chlorine, forming a chloride; with carbon, forming cyanogen; and with oxygen, forming a series of compounds. These are nitrous oxide, or laughing gas, N_2O (see NITROUS OXIDE); nitric oxide, NO ; nitrous anhydride, N_2O_3 , forming nitrous acid with water; peroxide of nitrogen, NO_2 , or N_2O_4 ; and nitric anhydride or anhydrous nitric acid, N_2O_5 , which in combination with water forms nitric acid. Nitric oxide is a gaseous body produced by the partial deoxidation of nitric acid, by the action of copper turnings or mercury on the acid diluted with water. Nitric oxide is a colorless gas, of specific gravity, 1.039. It is irrespirable, possessing a strong, disagreeable odor. Nitrous anhydride was formed by Dulong, by mixing in an exhausted flask one volume of oxygen with four volumes of nitric oxide, both dry. Liebig obtained it by the action of eight parts of nitric acid on one of starch. Nitric peroxide, or peroxide of nitrogen (N_2O_4 , or NO_2), is seen in the red fumes which appear when air is admitted into a vessel containing nitric oxide.

Nitroglycerin. See **EXPLOSIVES.**

Nitro-hydrochloric Acid, mixture of nitric and hydrochloric acids, called by the alchemists *aqua regia*, because it possesses the power of dissolving the "king of metals," gold. Its energetic action is due to its free chlorine. Both platinum and gold are insoluble in either acid separately, but are readily attacked by the mixture, forming chlorides.

Nitrous Oxide, Nitrogen Monoxide, or **Laughing Gas**, colorless, transparent, nearly odorless gas, having a sweet taste, and freely soluble in cold water; obtained from ammonium nitrate; most important property, its anæsthetic effect on the animal system. When respired it produces an exhilaration of the whole system, and often a disposition to uncontrollable laughter. It diminishes and destroys the sense of pain, and if its administration is continued produces a state of unconsciousness. It has been used since 1844 in the extraction of teeth, and is now given to patients preliminary to ether both from economy and because more rapid insensibility is produced.

Nitzsch (nitsh), **Gregor Wilhelm**, 1790-1861; German classical scholar; Prof. of Ancient Literature at Kiel, 1827-52, and then Prof. of Classical Philology at Leipzig; chiefly known as the most learned and persistent advocate of the unity of the Homeric epic.

Niuchwang', or **Niutschuan'**. See **NEW-CHWANG.**

Nix, or **Nix'ie**, in the popular mythology of the Teutonic races, a water spirit usually malignant, and often assuming the human form, though able to take any other shape at will. Nixies were resorted to to determine the future, and their good will might be obtained by gifts. From the same etymological root we have "Old Nick" as a name for the devil.

Niza (nēt'sā), **Marcos di**, abt. 1495-1542; discoverer of Arizona; b. Nice, Italy; Franciscan missionary in Peru, Guatemala, Nicaragua, and Mexico; led expedition N. from Culiacan, Mexico, in search of reported rich cities, 1539; reached the Cibola region; saw probable Zuni pueblos; turned back by hostility of Indians.

Nizami (nī-zā-mē'), **Abu Mohammed ben Yusuf Sheikh Nizam eddin**, 1141-1202; one of the greatest Persian poets; b. near Kum; works include a "Divan" of 28,000 distichs; "Treasury of Mysteries," "Khosrau and Shirin," romantic epic; "Laila and Majnun," "Iskandarnamah," work on Alexander the Great, and "The Seven Portraits."

Nishni Novgorod (nēzh'nī nōv-gō'rōd), town of Russia; capital of government of same name; on the Volga, at its confluence with the Oka; 275 m. E. of Moscow; is divided into two parts, the principal one being on the steep promontory, triangular in shape, and 400 ft. high, at the apex of which stands the Kremlin, or citadel, surrounded by a wall 30 ft. in height. This portion of the town is mainly made up of three handsomely built streets; the low town consists of one long street along

the Volga. The town is remarkable for a great fair held annually from July 15th into September, on a triangular space formed by the junction of the left bank of the Oka with the right bank of the Volga. Pop. (1907) 90,053.

Njord (nyerd), in Scandinavian mythology, a divinity that presides over the winds, quiets the sea, and is worshiped by sailors and fishermen. He was reared in Vanaheim, but the Vans gave him as a hostage to the Asas when the war between them was ended. His wife is Skade, daughter of the giant Thjasse. His dwelling is Noatun, near the sea. He is the opposite of the sea giant Ægir, who represents the turbulent ocean.

No, name given to classical dramatic performances in Japan; compared to the old Greek drama from its stateliness, solemnly chanted choruses, quasi-religious element, and from the fact that it is performed in the open air. Scenery is absent, but the robes of the performers are magnificent. These No performances are kept up by the aristocracy, and are a feature of polite Japanese society. Each piece takes about an hour to act, but, in addition to the half-dozen pieces in a complete performance, comic interludes are interspersed, causing the performance to take up the greater part of a day.

No, **Lake**, lake in central Africa; meeting-place of all the upper waters of the White Nile, gathered into the Bahr-el-Ghazal, coming from the W., and the Bahr-el-Jebel, coming from the S.; main stream is the Bahr-el-Jebel, and the river issuing from Lake No is known as the Bahr-el-Abiad, or White Nile.

No'ah, patriarch who, on account of his piety, was saved by God from the Deluge, and thus became the second founder of the human race; was a son of Lamech, and the father of Shem, Ham, and Japheth (Gen. v, 28-ix).

Noailles (nō-āl'), **Adrien Maurice** (Duc de), 1678-1766; French marshal; b. Paris; married niece of Mme. de Maintenon; served in Spain as general and diplomatist, 1705-12; Minister of Finance, 1715-18; dismissed for opposing schemes of John Law; commander in chief in war against Germany; captured Worms; defeated at Dettingen by George II of England, 1743; later ambassador to Spain; left "Political and Military Memoirs."

Noailles, **Louis Marie** (Vicomte de), 1756-1804; French general; son of Philippe de Noailles, Duc de Mouchy; brother-in-law of Marquis de Lafayette; came to U. S., 1779; fought in several engagements; arranged with Cornwallis the surrender at Yorktown, 1781; espoused cause of French Revolution, 1789; retired to England at beginning of Reign of Terror and imprisonment of king; brigadier general in Santo Domingo; mortally wounded in capturing English ship near Havana.

No-A'mon (Nah. iii, 8), or **No** (Ezek. xxx, 14-16, Jer. xlvi, 25), Hebrew name of Thebes in upper Egypt, the Diospolis Magna of the Greeks. The name corresponds with the Egyptian Nu-amen, city of Amon, or Nu, "the city" *par excellence*.

No'bel, Alfred Bernhard, 1833-96; Swedish physicist; b. Stockholm; son of an inventor and manufacturer of explosives; took out patents for manufacture of explosive composed of nitroglycerin and common blasting powder; invented dynamite, gelatinous nitroglycerin, and ballistite, also artificial gutta-percha; left a fortune of \$9,200,000 to found a prize fund, the interest of which to be divided annually into five equal parts (about \$40,000 each), and awarded to the persons who had most distinguished themselves in physical science, chemistry, physiology or medicine, idealistic literature, and the advancement of universal peace. Under the last class Pres. Roosevelt was awarded the prize, 1906, and with it founded a fund for the promotion of industrial peace. In 1907 the literature prize was awarded to Kipling. The 1911 prizes were awarded as follows: Literature, M. Maurice Maeterlinck, of Belgium; physics, Prof. Wilhelm Wien, Würzburg, Germany; chemistry, Mme. Curie, of the Sorbonne, Paris; medicine, Prof. Allvar Gullstrand, Upsala, Sweden; peace, divided between T. M. C. Asser, The Netherlands, and Alfred Fried, Vienna, Austria. The peace prize of 1910 was bestowed upon the International Permanent Peace Bureau, Berne.

Nobility, as a term of rank, a state of social dignity, transmissible by descent and often accompanied by political privilege. In ancient Egypt, as now in India, nobility was inherent in the highest castes, the sacerdotal and the military. In Sparta the nobility originated from conquest; at Athens it resulted from older settlement, the nobles or eupatrids being the descendants of those who at one time had constituted the entire people. In Rome the patricians, who, as at Athens, had originally been the whole people, formed for a long time an exclusive caste, allowing no intermarriage with inferiors, and possessing nearly all the political power; but gradually the plebeians gained equal political rights, and, after this, those among them who became curule magistrates were not only accounted noble themselves by virtue of their office, but also transmitted dignity to their descendants. Nobility in the old German tribes was of immemorial origin, the earliest records of Teutonic peoples showing clearly the division into noble, simple freeman, and bondman. The origin of the existing nobility of Europe, however, can generally be traced to personal service to the king, who granted certain privileges or immunities either as a reward for past or an inducement to future service. (See FEUDAL SYSTEM.)

In Great Britain the term nobility is used in an exclusive sense, being limited to the five ranks of the peerage: duke, marquis, earl, viscount, and baron. Baronet is a title of honor, and confers no political privileges. The Federal Constitution of the U. S. declares that "no title of nobility shall be granted by the United States, and no person holding any office of profit or trust under them shall, without the consent of Congress, accept of any present, emolument, office, or title of any kind whatever, from any king, prince, or foreign state." See RANK.

Nobunaga (nō-bō-nā'gā), 1533-82; Japanese statesman; b. province of Owari; engaged in a conflict with the Buddhist priesthood, whose headquarters at Hiyeisan he burned to the ground, 1573; became virtual ruler of Japan under the title of Dainagon, and began the work of political reconstruction and concentration, perfected later by Hideyoshi and Iyeyasu. Again, 1575-80, he had to struggle against a new coalition of Buddhist monks; eventually fell a victim to treachery.

Noddy, sea bird of the tern family, approaching the character of the gulls; found in nearly all parts of the world; often alights on ships, and lets itself be captured without resistance or attempt at escape.

Nodes, points in which the path of any planetary or cometary body intersects the plane of the ecliptic, or any other plane of reference; also the points in which the orbit of any satellite intersects the plane of the orbit of its primary. Nodes are distinguished as ascending and descending. The ascending node is that through which the body passes from the S. to the N. side of the plane of reference; the descending, that through which it passes from N. to S. The nodes of most other members of the solar system undergo gradual displacement in the heavens, making, in a period of time longer or shorter, a complete revolution. The period for the moon is about eighteen and two-third years, but for the planets it reaches many thousands of years.

Noëtians (nō-ē'shānz), heretical sect of the third century. Its founder, Noëtus, a presbyter of Smyrna, had embraced the Monarchian doctrine that there is no distinction between the persons of the Godhead, and further avowed the doctrine of the Patripassians that the Father suffered in His own person and nature. He was excommunicated abt. 230. The sect prepared the way for Sabellianism.

No'la, city in Italy; province of Caserta; 15 m. ENE. of Naples; is one of the oldest cities of Campania; thrice unsuccessfully attacked by Hannibal; has a museum of antiquities, and sepulchers which have supplied Etruscan vases to the museums of Europe. Pop. (1901) 8,111.

Nol'lekens, Joseph, 1737-1823; English sculptor; b. London; pupil of Schumaker; studied at Rome, where he remained ten years, executing bas-reliefs, groups of figures, and busts; settled in London, 1770; made busts of George III, Fox, Pitt, Warren Hastings, Johnson, Garrick, and the principal celebrities of the time, considered excellent likenesses; executed numerous commissions for public monuments and statues, as well as mythological groups.

Nol'le Pros'equi (Latin, "to be unwilling to prosecute"), usually abbreviated to "nolle prossed," law term meaning that the plaintiff has declared in court and entered on the record that he will no longer prosecute his suit. In civil cases this is superseded in modern times by a nonsuit, but it is still common in criminal cases. It is entered by the officer who acts

for the government, when, from insufficiency of evidence or for other reasons, he is unwilling to press the trial.

Nom'archy, political division of Greece; same as province.

Nombre de Dios (nôm'bră dă dē'ōs), former Spanish settlement on the N. coast of Isthmus of Panama. Nicuesa's transient settlement of that name was probably on or near the site of the modern Porto Bello; abandoned, 1511. In 1519 a new town of Nombre de Dios was founded on the Bay of San Blas, and this became the N. terminus of the route over the isthmus from Panama. During the sixteenth century all the trade of Peru, and much of that from W. Mexico, Guatemala, and the Spice Islands, passed through it; it was thus one of the most important ports in America. The town was attacked by Drake, 1572; destroyed by him, 1595; abandoned, 1597, Porto Bello taking its place.

Nome, town, mining camp, and subport of entry in Alaska; on Seward Peninsula, immediately W. of Cape Nome; 250 m. SE. of Cape Prince of Wales; is center of great gold-mining district discovered 1898; has several banks, twelve public schools, theater, newspapers, large stores, Alaska Academy of Sciences, providing lectures and maintaining a library; hotels, excellent railroad communications, electric lights, telegraph and telephone services, and other city advantages; business section destroyed by fire, 1905, but speedily rebuilt. Pop. (1900) 12,486; (1910) 3,924.

Nom'inalists, in philosophy, those schoolmen who held the doctrine that universals (general notions, such as those of man, animal) have no real existences corresponding to them, but are mere names or words (*flatus vocis*). The chief Nominalists were Roscellinus and William of Occam. In modern times their doctrine has been adopted by Thomas Hobbes and John Stuart Mill. Herbert Spencer, though claiming to be a Nominalist, is likewise a Realist when he holds that the persistent force is an ultimate reality producing and annulling the particular forces. Abelard was a Conceptualist or moderate Nominalist, and in this class are John Locke, Thomas Reid, Dugald Stewart, Dr. Thomas Brown, Sir William Hamilton, and other modern psychologists.

Nom'inating Conven'tion, in the U. S., meeting of delegates of a political party to nominate candidates for national, state, or local offices. Such nominations were formerly made by the legislative caucus, which in the case of state elections began to give place to the nominating convention, 1825. In national elections the choice of candidates by the congressional caucus occasioned much complaint, and, 1824, the nominees of the caucus were defeated in the presidential election. From that time there was a steady tendency toward a more popular method of choosing candidates, and, 1831, the first National Nominating Convention was held by the Anti-Masonic party at Baltimore. Similar conventions were held by the two great national parties, 1832, and since 1840

all candidates for the presidency have been chosen in this way. The conventions meet in the summer immediately preceding the presidential election in November. They are composed of delegates chosen by the voters of the party, each state being entitled to twice as many delegates as it has persons representing it in Congress. Delegates from the territories and the District of Columbia are also admitted, though these political divisions have no vote in the presidential election. See **NOMINATION**.

Nomina'tion, in politics, an act of designation to office, the ratification of which depends on another person or body of persons. The President of the U. S. nominates to the Senate the incumbents of high Federal offices, and makes the appointments only after approval. The head of an executive department nominates to the President those whom he desires as his subordinates, and a national, state, county, or town convention of a political party nominates its candidates for office in anticipation of the elections. In some states there are in force what are known as "direct nomination," or "direct primary" laws, under which candidates for public office are nominated by the direct vote of the electors of their party, instead of by nominating conventions, to which delegates are elected by the voters. See **BALLOT**; **CONVENTION**; **PRIMARY ELECTION**.

No'mos, one of the territorial divisions of ancient Egypt.

Noncommis'sioned Officers, army officers intermediate between the privates and the commissioned officers, such as corporals, sergeants, sergeant majors, etc. They are not commissioned, but (in the U. S.) receive a warrant; in the British army the latter is the case only with the higher grades. In the U. S., besides those above mentioned, there are ordnance, quartermaster, commissary, and saddler-sergeants, hospital stewards, drum majors, orderly sergeants, and certain musicians who have the rank of sergeant or corporal. In the British army there are included bombardiers, master gunners, staff clerks, bandmasters, etc.

Non Com'pos Men'tis, in law, phrase applied to a person "not of sound mind"; therefore irresponsible for his acts.

Nonconduct'ors. See **ELECTRICITY**.

Nonconform'ists, or Dissent'ers, name applied to those residents of Great Britain and her colonies who are not connected with the Church of England. There are nearly 300 denominations in Great Britain. Under the Act of Uniformity of 1558 many clergymen were, after 1565, ejected from their livings, and some were imprisoned. A new Act of Uniformity was passed, 1662, requiring that every beneficed minister, and even every schoolmaster, should assent to everything contained in the "Book of Common Prayer," and that no one should hold any preferment without episcopal ordination. For their unwillingness to conform to the requirements of this act, 2,000 clergymen were ejected from their livings; and at this time the title Nonconformists came into use.

Nonin'tercourse Act. See **EMBARGO.**

No'ninus, Marcellus, Latin grammarian from Africa, of the beginning of the fourth century, whose work, "*Compendiosa doctrina ad filium*," in twenty books, is extremely valuable because of its numerous citations from earlier writers, no longer extant.

Nonjur'ors, those members of the Church of England who refused to take the oath of allegiance to William and Mary. Sancroft, Archbishop of Canterbury, with several of the bishops and about 400 priests, declined to take it, on the ground that they were already bound by their oath of allegiance to King James II. In consequence of their refusal they were deprived by act of Parliament, 1691, of their ecclesiastical preferments. The deprived bishops were Sancroft, Turner, Frampton, White, Ken, and Lloyd. Many of the laity, regarding the deprivations as unlawful, adhered to these prelates and formed a religious communion, which they called the faithful remnant of the Church of England. The Nonjurors, being to a great extent cut off from active life, devoted themselves to literature. The historian Jeremy Collier was one of their bishops. Leslie, the controversialist; William Law, the polemic and mystic, and Robert Nelson, the commentator on the feasts and fasts, belonged to their communion.

Non'nus, Greek poet of the fifth century after Christ; b. Panopolis, Egypt. The details of his life are unknown, but two of his works are still extant—a huge epic, in forty-eight books, and a transcription of St. John in Greek hexameters.

Non'sense, Fort, name given a defensive work on a hill overlooking Morristown, N. J.; projected by Washington while encamped there in winter of 1779-80 to keep his famished army from revolt till supplies were received; memorial stone set up on site of earthworks, 1888.

Non'suit, in law, a judgment allowing or ordering the plaintiff to discontinue the action which he has instituted. A nonsuit is generally granted on the ground of a default or insufficiency of the evidence offered by the plaintiff, and in case of a nonsuit the plaintiff pays the costs of the action. A nonsuit may generally be taken either at any time before the rendering of the verdict by the jury or a judgment by the court, according to the common-law practice; or, as in some of the U. S., at any time before the case is finally submitted to the jury or the court.

Noot'ka Dog, large dog found among the Indians of Vancouver Island, British Columbia, chiefly remarkable for its long woolly hair, which is spun and woven into cloth by the natives.

Nordau', Max Simon, 1849—; German author; b. Budapest; son of Gabriel Südfeld, rabbi; had his present name legally conferred on him at the age of fifteen; practiced as a physician in his native city, 1878-80, then settled in Paris; contributed at an early age to

newspapers; traveled widely in Europe; author of "From the Kremlin to the Alhambra," "Paris under the Third Republic," "Degeneration," "The Comedy of Sentiment," and "The Drones Must Die," novels; "The War of the Millions," drama; "Zionism," "Conventional Lies of Society."

Nordenskjöld (nör'dén-shöld), Nils Adolf Erik (Baron), 1832-1901; Swedish explorer; b. Helsingfors, Finland; settled in Sweden, 1857; became superintendent mineralogical department Royal Museum, Stockholm, 1858; accompanied Torell on Arctic expeditions, 1859 and 1861; led similar expeditions, 1864, 1868, 1872; made scientific journey to Greenland, 1870, and Siberia, 1875, 1876; accomplished the Northeast Passage, 1878-79; published "Voyage of the Vega Round Asia and Europe," "Scientific Results of the Vega Expedition," and a work on Greenland relating to later journeys.

Norfolk (naw'r'fök), Dukes of, 1483, Earls of Arundel, 1139; of Surrey, 1483; and of Norfolk, 1644; family of the English nobility which enjoys the distinction of hereditary earl marshal, premier duke, and premier earl of England. The earldom of the E. Angles was conferred by Henry I (1135) on Hugh Bigod, who lost that title by rebellion against Stephen and Henry II, but was reconciled to the latter monarch and made Earl of Norfolk, 1167. His grandson, Roger, was made earl marshal on the failure of the male line of the earls of Pembroke, 1225, but both titles became extinct on the death of his nephew, of the same name, 1307. After having been held by Thomas of Brotherton, brother of Edward II (1313-38), and by Thomas Mowbray (1386-1413), both titles were granted by Richard III, June 28, 1483, to John Howard, lord admiral of England, France, and Aquitaine, distinguished statesman and military leader, killed at the battle of Bosworth Field, August 22, 1485, and attainted shortly afterwards. **NORFOLK, THOMAS HOWARD** (second Duke of), d. 1524; son of the first John Howard; ennobled (as Earl of Surrey) at the same time as his father, whose attainder he also shared; restored to his original title, 1488; distinguished himself in war and diplomacy; made earl marshal, 1510, and duke, 1514, as a reward for having gained the battle of Flodden Field. **NORFOLK, THOMAS HOWARD** (third Duke of), 1474-1554; son of the preceding; in many respects the most noted member of the family; took a prominent part in public affairs; repeatedly commanded armies of invasion against Scotland; presided over the court which sentenced Queen Anne Boleyn to death, 1536; suppressed the rebellion known as the "Pilgrimage of Grace," 1537; was thrown into the Tower, 1546, sentenced to death and attainted, 1547, but escaped through the opportune death of Henry VIII on the following day; had his title restored by Queen Mary. **NORFOLK, THOMAS HOWARD** (fourth Duke of), 1536-72; son of Henry Howard, Earl of Surrey; intrigued for the hand of Mary, Queen of Scots; beheaded. **NORFOLK, HENRY FITZ ALAN HOWARD** (fifteenth Duke of), 1847—; premier duke and earl of Eng-

land; b. Carlton Terrace; succeeded his father, 1860; special envoy to the pope, 1887; Mayor of Sheffield, 1895-96; its first lord mayor, 1896-97; postmaster-general, 1895-1900; served with the army in S. Africa, 1900; first mayor of Westminster, 1900-1.

Norfolk, city in Norfolk Co., Va.; on the Elizabeth River and the Albemarle and Chesapeake and Dismal Swamp canals; 8 m. from Hampton Roads, 88 m. SE. of Richmond; settled 1680; bombarded by the British, 1776; organized as town, 1705; chartered as city, 1845; second largest city in state; with Portsmouth on opposite side of river constitutes the largest U. S. naval station and a single customs district. It contains U. S. navy yard, U. S. Naval Hospital, St. Vincent de Paul Hospital, Norfolk Mission College (Presbyterian), Leach-Wood Seminary, Norfolk Academy, Phillips-West School for Girls, Norfolk College for Young Ladies, Retreat for the Sick; has a large trade in coal, cotton, canned goods, oysters, and peanuts, exceptional railroad and steamship connections, large stockyards, and manufacturing plants yielding products (1905) valued at \$10,341,000. Pop. (1910) 67,452.

Norfolk Island, dependency of New S. Wales; in the S. Pacific; midway between New Caledonia and New Zealand; area, 10 sq. m.; discovered by Capt. Cook, 1774; settled by convicts and freedmen from New S. Wales, 1787; abandoned, 1810; made a penal establishment for incorrigible offenders, 1825; at one time prisoners exceeded 2,000; again abandoned, 1855. In 1857 the island was given by the British Govt. to descendants of the mutineers of the *Bounty*, some of whom emigrated to it from Pitcairn Island. Pop. (1901) 870.

Noricum, province of the Roman Empire; between the Danube and the Save; bounded E. by Pannonia and W. by Vindelicia and Rætia; corresponded approximately to the portion of Austria proper S. of the Danube, together with the provinces of Styria, Carinthia, and Salzburg; was conquered late in the reign of Augustus; principal city was Noreia (the modern Neumarkt, Styria).

Nor'man Con'quest, or The Conquest, conquest of England, 1066, by William, Duke of Normandy, who claimed the throne, recently ascended by Harold, through his great-aunt Emma, mother of Edward the Confessor. Landing with 60,000 men, William met Harold at Hastings, and in the battle that ensued the Saxon lost his life and his kingdom. Among the results of the Conquest were the union of England and Normandy, the enslavement of the Saxons and Danes, and the introduction of the feudal system, together with the Norman French language.

Nor'mandy, old province of France, bordering on the English Channel, and comprising an area of 10,534 sq. m.; now divided into the departments of Seine-Inférieure, Eure, Orne, Calvados, and Manche. When, 1066, William II conquered England, Normandy entered into a close political relation to that country, which continued, generally as a formal union, until,

1204, Philip Augustus conquered the province and made it a part of France. After the battle of Agincourt, 1415, the English once more held it, but only till 1449, when Charles VIII finally united it to France.

Nor'man French, properly, the French dialect or dialects of Normandy, or the region occupied by the invading Normans or Northmen, which was granted their leader by Charles the Simple early in the tenth century. In English the term is used to designate the Old French brought into England as a result of the Norman conquest, and there having a history somewhat different from that of any form of French in France.

Normans, and **North'men**, names usually given to the ancient and mediæval inhabitants of Scandinavia; the former more especially to that portion of them who conquered and settled in Normandy. From 787 the Danes made incursions along the English coast, and ruled England for more than thirty years; they also conquered parts of Ireland. Iceland was discovered by them 860, and settled 874. In 876 or 877 Greenland was discovered, and a colony planted there, 983-85. This led, according to the Icelandic sagas, to the discovery of the mainland of America, 986.

The motive of these expeditions was at first merely the increase of population at home and a natural love of adventure and booty. But when in the ninth century the consolidation of the three great Scandinavian kingdoms broke the power of the petty kings and independent nobles, they were impelled to seek a freer life in some new home, and the raids assumed a new character and importance.

In Russia the Normans were called Varangians. Rurik, a Northman, occupied Novgorod in 862, and founded the dynasty which gave sovereigns to Russia till 1598. About 865 the Varangians appeared with a fleet before Constantinople; and it was not until an alliance was made between Vladimir the Great and the Greek emperor (988) that the incursions ceased. From 841 the whole coast of W. Europe from the Elbe to the Guadalquivir was a prey to the Northmen, and many cities were plundered by them. In 885 they laid siege to Paris. King Charles the Fat bought them off with 700 lb. of silver and a free passage to the upper Seine and Burgundy. The most redoubtable of the Northmen afterwards was Hrolf, better known as Rollo, first Duke of Normandy. From Charles the Simple he accepted the hand of a daughter, together with a tract of Neustrian territory N. of the Seine from Les Andelys to the sea (the NE. portion of modern Normandy), in exchange for Christian baptism and an oath of fealty (912). Rollo distributed among his followers the lands of Neustria and laid the foundations of the feudal system which William the Conqueror transplanted into England (1066-87). Simultaneously with the conquest of England other Norman adventurers conquered S. Italy and Sicily.

Norns, goddesses of fate in Scandinavian mythology. There are three—Urd (the Past), Verdande (the Present), and Skuld (the Fu-

ture). They dwell near Urd's fountain, by one of the roots of the great ash Ygdrasil, where the gods meet in council. They water the branches of Ygdrasil to keep the tree from withering and fading. They weave the web of men's lives, stretching it from the radiant dawn to the glowing sunset. The destiny of the world is in the hands of the norns, and even the gods must submit to their decrees. The three witches in Shakespeare's "Macbeth" have their origin in the Scandinavian norns. See FATES.

Noronha (nō-rōn'yā), **Fernando de**. See FERNANDO DE NOBONHA.

Norristown, capital of Montgomery Co., Pa.; on the Schuylkill River and Canal; 16 m. NW. of Philadelphia; in an agricultural and mineral region; connected with Bridgeport by several bridges across the river; seat of Charity Hospital for the Insane, Friends' Home for the Aged, McCann High School; manufactures steel castings, cotton, and woolen goods, shirts, hosiery, glass, carpets, brick, and iron-furnace and rolling-mill products. Pop. (1910) 27,875.

Norrköping (nōrkō-pīng), town of Sweden; on the Motala; near the Baltic; river crossed by several substantial bridges, and lined with commodious quays and spacious docks; town ranks as second manufacturing city of Sweden; has shipbuilding and sugar-refining establishments, salmon fishery, and manufactures of paper, tobacco, leather, cotton, linen and woolen goods, and other articles. Pop. (1907) 45,203.

Norse'men, or **North'men**. See VIKINGS.

North, Francis (Baron Guilford), 1637-1734; English jurist; son of fourth Baron North; called to the bar, 1661; retained by the crown in important cases; became Solicitor General, 1671; Attorney-general, 1673; Chief Justice of the Common Pleas, 1675; Privy Councilor, 1679; Lord Keeper of the Great Seal, 1682; created Baron Guilford, 1683.

North, Frederick (eighth Lord), second Earl of Guilford, 1733-92; English statesman; entered the Commons as a Tory when twenty-two; became a lord of the treasury, 1759; supported the American Stamp Act, 1765; became Chancellor of the Exchequer and leader of the Commons, 1767; First Lord of the Treasury and Prime Minister, 1770; proposed the colonial tea duty, 1773, and the Boston Port Bill, 1774; retired from office, 1782; joint Secretary of State with Fox in the "coalition ministry," 1783.

North Adams, city in Berkshire Co., Mass.; on the Hoosac River; terminus of the Hoosac Tunnel; surrounded by the high and picturesque Berkshire Hills; comprises several villages; and has Greylock, the highest mountain in Massachusetts, and Hudson's Brook, where there is an interesting natural bridge of soft marble in its vicinity. The city contains a large number of cotton and woolen mills and shoe factories, and was one of the first manufacturing places in the N. and E. states to make use of Chinese labor. Pop. (1910) 22,019.

North America. See AMERICA.

Northampton, capital of Northampton Co., England; on the Nene; 50 m. SE. of Birming-

ham; has a fine townhall, free library, museum, schools of science and art, and thirteen churches, including St. Sepulchre's, one of the few remaining round churches in England. Its manufactures of hosiery and lace have declined, but those of leather, boots, and shoes are very important; also its breweries, iron foundries, and flour mills. Pop. (1901) 87,021.

Northampton, capital of Hampshire Co., Mass.; on the Connecticut River; 17 m. N. of Springfield; has an elevated site, affording a fine view of Mt. Holyoke and Mt. Tom, and is connected with Hadley by a bridge across the river; notable institutions, Smith College, for women (nonsectarian); Burnham School for Girls and Capen Classical School; Clarke Institution for Deaf Mutes (founded 1867, endowed by John Clarke with \$3,000,000), State Lunatic Asylum, Soldiers and Sailors' Memorial Hall, Dickinson Hospital, Old Ladies' Home, Hillyer Art Gallery, six libraries, and manufactures of baskets, sewing machines, pocketbooks, cotton, woolen, and silk goods, brushes, paper, buttons, and cutlery. Pop. (1910) 19,431.

North Carolina (named in honor of Charles I), popular name OLD NORTH STATE; state in the S. Atlantic division of the American union; bounded N. by Virginia, E. and SE. by the Atlantic, S. by the Atlantic, S. Carolina, and part of Georgia; W. by Tennessee; extreme length, E. to W., 503½ m.; average breadth, 100 m.; area, 52,426 sq. m.; pop. (1910) 2,206,287, including 697,843 negroes. Principal cities and towns, Wilmington, Charlotte, Asheville, Raleigh (capital), Winston, Greensboro, Newbern, Concord, Durham, Elizabeth City, Salisbury, Goldsboro, Washington, Fayetteville, Gastonia, High Point, Kinston. Surface in the coastal region generally level, and in many places marshy; to the W., undulating, and hilly through the middle and Piedmont cos., the hills finally becoming small mountains, and these in turn giving place to the Blue Ridge (average elevation, 4,000 ft.; highest peaks, the Grandfather and the Pinnacle, nearly 6,000 ft.) and adjacent mountain chains, which reach their maximum development in the Black Mountains, which contain Mt. Mitchell, the highest peak (6,688 ft.) E. of the Rocky Mountains. The Great Smoky Mountains, forming part of the mountain boundary with Tennessee, have many high peaks, including Clingman's Dome, 6,660 ft. The E. region contains large areas of the finest farming lands of the state and valuable forests of pine.

N. Carolina is well drained, though none of its streams are large. In the mountain plateau are the Hiwassee, Tennessee, Pigeon, French Broad, Nolichucky, and the Watauga, all flowing toward the Mississippi. The New River flows N. into the Ohio. E. of the Blue Ridge, the Broad, Catawba, and Yadkin flow to the Atlantic through S. Carolina, the Broad becoming the Wateree and the Catawba the Congaree, the two uniting to form the Santee. The Yadkin, uniting with the Uwharrie, becomes the Pedee. The Dan, the longest river in the state, has part of its course in Virginia. Other rivers rising at some distance from the mountains are the Tar, near its

mouth called the Pamlico; the Neuse, the Cape Fear, formed by the Haw and the Deep; the Lumber, changing its name in S. Carolina to Little Pedee, and the Waccamaw. All of the rivers E. of the Blue Ridge are navigable 100 or more miles for light craft. The largest sheets of inland water are Albemarle and Pamlico sounds, the former about 50 m. long, with a maximum width of about 15 m., and Pamlico



about 75 m. long and 15 to 25 m. broad. Between them and the ocean are long, narrow islands of sand, which extend into the ocean in some places 100 m., forming dangerous shoals, of which Cape Hatteras, Cape Lookout, and Cape Fear are the most prominent visible points. More than 100 sq. m. of the Great Dismal Swamp is in N. Carolina. Mean temperature in January, E. district, 43.6° F.; W., 38.5°; for state, 40.8°; in July, E. district, 78.8°; W., 74.4°; for state, 77.8°; mean annual temperature for state, 58.0°. Mean annual precipitation for state, 53.28 in.; average fall of snow, less than 5 in. Storms on the Atlantic coast, violent and destructive to shipping.

Soil generally a loam, which becomes more sandy in the E. and frequently more clayey in the central and W. regions. The great variety of soils and the wide range of climate give rise to a rich and varied forest growth. Principal farm crops, 1911: Corn, 49,680,000 bu.; wheat, 6,636,000 bu.; rice, 13,000 bu.; oats, rye, potatoes (Irish), hay, and tobacco, 99,400,000 lb., valued at \$11,530,400; cotton crop, 1910, 774,752 bales of upland, valued at \$49,430,000, and 312,000 tons of seed, valued at \$9,920,000; value of live stock (1911), \$72,467,000. Leading manufacturing industries: Cars, cotton goods, fertilizers, grist-mill products, furniture, leather, lumber, tar, turpentine and resin, planing-mill products, oil, cotton seed and cake, tobacco, flour. "Factory-system" plants (1909), 4,931; capital, \$217,185,000; value of products, \$216,656,000. Mineral products include granite and granitic gneiss, brown, red, and gray sandstone; white, pink, and blue marbles; clays of various kinds, roofing slate, millstone, kaolin, talc, agalmatolite, baryta, corundum, mica, bi-

tuminous and anthracite coal, iron ores, gold, silver, and copper; gems, such as the diamond, ruby, sapphire, hiddenite, emerald, beryl, amethyst, garnet, and zircon. Value products (1910), \$2,616,131, including clay products, which alone (1907) were valued at \$1,223,664. Customs district, Wilmington, exports from which (1910-1) amounted in value to \$28,812,543.

Chief educational institutions: Univ. of N. Carolina (nonsectarian), Chapel Hill; Biddle Univ. (Presbyterian), Charlotte; Davidson College (Presbyterian), Davidson; Guilford College (Friends), Guilford; N. Carolina College (Evangelical Lutheran), Mount Pleasant; Catawba College, Newton; Shaw Univ. (Baptist), Raleigh; Rutherford College (nonsectarian), Rutherford; Trinity College (Methodist Episcopal South), at Trinity College; and Wake Forest College (Baptist), Wake Oollege. There are an agricultural and mechanical college for white students and one for colored, five state normal schools for colored teachers, a number of county normal schools for white teachers, and a state normal and industrial school for girls at Greensboro.

The first charter for a settlement was granted to Sir Walter Raleigh, 1584. Colonists were sent to Roanoke Island, 1585, but returned, 1586. Another colony arrived, 1587, with John White as governor, who shortly went to England for reinforcements, leaving among the colonists his daughter, wife of Ananias Dare, and her infant, Virginia, the first white child born in America. These colonists were never found, and were supposed to have died or been massacred, and not until more than 350 years later was it discovered that they had removed inland and intermarried with the Indians. Their descendants, bearing English names, and speaking the English of Raleigh's time, are to be found in Robeson Co. In 1663 Charles II formed the province of Carolina, which he granted to eight noblemen. Locke wrote for it a scheme of government, which was nominally its fundamental law for about twenty-five years. The Tuscaroras, after a sanguinary war, were subdued, 1713, and finally emigrated to New York. In 1729 Carolina became a royal government, and N. and S. Carolina were made distinct provinces. N. Carolina sent representatives to the first Continental Congress, 1774, and united in adopting the declaration of colonial rights. An association for the defense of those rights was formed in Mecklenburg Co., which on May 20, 1775, formally renounced allegiance to the crown and published a declaration of independence. In April, 1776, the N. Carolina convention authorized their delegates to unite with the other colonies in a declaration of independence. In December the province adopted a state constitution, and elected Richard Caswell governor. The battle of Guilford Courthouse, March 15, 1781, between Greene and Cornwallis, was the chief event of the war within this state.

On February 28, 1861, the people voted by a small majority not to call a convention for considering the question of secession; but after the attack on Fort Sumter, Gov. Ellis raised troops and seized Forts Caswell, Johnson, and Macon. On May 21st the ordinance of secession was

passed and the Confederate constitution was ratified. These measures were not submitted to the people. On August 29th an expedition under Commodore Stringham and Gen. B. F. Butler captured Forts Hatteras and Clark. On February 8, 1862, an expedition under Commodore Goldsborough and Gen. Burnside captured Roanoke Island, and other places were soon taken. Fort Fisher, the chief defense of Wilmington, was bombarded by Admiral Porter December 24, 1864, but the land forces under Butler, being unable to cooperate, the attack failed. Another attempt by Porter and Gen. Terry, January 15, 1865, resulted in the surrender of the fort and the other defenses of Cape Fear River. Wilmington was taken by Schofield on February 22d, and Goldsboro on March 21st, Kingston having been occupied on the 14th. At Goldsboro Schofield was soon joined by Sherman, who had defeated Hardee at Averysboro and J. E. Johnston at Bentonville. Raleigh was occupied April 13th, and on the 26th hostilities were ended by Johnston's surrender. The government, under the "reconstruction laws" of Congress, was inaugurated July 1, 1868. The General Assembly ratified the Fourteenth Amendment to the U. S. Constitution on the next day, and the Fifteenth March 4, 1869.

Northcote, Sir Stafford Henry, 1818-87; English statesman; b. London; educated at Eton and Balliol College, Oxford; graduated with honors, 1839; called to the bar, 1847; one of the secretaries of the Universal Exhibition, 1851. He entered Parliament as a Conservative, 1855; took active part in all questions relating to art and education; President of the Board of Trade in Lord Derby's third administration, 1866; Secretary of State for India, March, 1867-December, 1868; elected governor of the Hudson Bay Company, January, 1869; member of the high joint commission which drew up the Treaty of Washington, 1871; Chancellor of the Exchequer in Disraeli's Cabinet, 1874; published "Twenty Years of Financial Policy," 1862; became Earl of Iddesleigh, 1885.

North Dako'ta, state in the N. central division of the American union; bounded N. by Assiniboia and Manitoba, Canada; E. by Minnesota, S. by S. Dakota, W. by Montana; area, 70,837 sq. m.; pop. (census of 1910) 577,056. Principal cities and towns: Fargo, Grand Forks, Bismarck (capital), Jamestown, Valley City, Grafton, Wahpeton, Dickinson, Devil's Lake, Mandan, Minot, Larimore, Casselton, Langdon, Hillsboro, Park River, Cando, Lisbon. The valley of the Red River of the North is a broad, level plain, from 50 to 60 m. wide. The James River valley is one of the most noted artesian-well districts in the world. Immediately N. of Devil's Lake, a veritable inland sea, about 49 m. long, is the Turtle Mountain and Big Coulee country. The mountains are a range of hills extending over a region 20 by 40 m., the greater part in the state and the remainder in Manitoba. Bear and St. Paul's buttes are the highest points, and have an elevation of only a few hundred feet. The Mouse River enters the state from Assiniboia, and, after a long sweep in oxbow shape, passes out at the NW. corner of Bottineau Co. into Mani-

toba; the territory it incloses is particularly adapted to stock raising. The Riviere de Lac, a tributary of the Mouse, has a valley 75 m. long.

The Coteau or Missouri slope country lies W. of the divide, between the James and the Missouri rivers, and is full of small hills. W. N. Dakota division lies W. of the Missouri River, and is more undulating than the E. section;



has widely separated hills, broad valleys, and conical buttes; and is well watered. Besides these rivers, good drainage is afforded by the Cheyenne, Coose, Pembina, Maple, Heart, Knife, Cannon Ball, Green, Sweetbriar, Curlew, Little Missouri, and other streams. The valley of the Red River was in the last glacial epoch a lake (see AGASSIZ, LAKE). Winters cold and rainless; atmosphere dry; summers warm by day and cool by night, with quite constant breezes; mean annual temperature at Bismarck, 39.4°; rainfall, 20.10 in.; at Pembina, 34.4° and 21.91 in.; at Buford, 38.7° and 13.91 in.

Soil exceedingly fertile almost everywhere, especially the rich bottom-land mold of the Red River valley, which contains the great wheat farms. Production of principal farm crops, 1911: Wheat, 73,200,000 bu.; oats, 51,230,000 bu.; barley, 20,475,000 bu.; corn, rye, flaxseed, (9,120,000), potatoes, and hay. Production of scoured wool (1911), 670,625 lb., valued at \$348,725; live stock (1911), valued at \$104,023,000. Mineral products include lignite, building and foundation stones, salt, limestone, hydraulic lime, iron ore, pottery and brick clays, natural gas; value products (1910), \$863,233. Principal manufactures: Flour, lumber, leather, bricks, cement, woolen goods, cigars; "factory-system" plants (1909), 752; capital invested, \$11,585,000; value products, \$19,137,000. Principal educational institutions: State Univ. and School of Mines, Grand Forks; State Agricultural College, Fargo; Red River Valley Univ., Wahpeton; Fargo College (nonsectarian), Fargo.

Capt. Lewis and Clarke, U. S. army, in their expedition of 1804-6, spent their first winter in camp among the Mandan Indians, near the present town of Mandan. Lord Selkirk built a fort at Pembina, on the Red River, 1810; the first steamer ascended the upper Missouri, 1830. The region was a part of the Louisiana Pur-

chase. In 1851 the first land was obtained of the Sioux Indians, and, 1857, the first settlement was made at Sioux Falls, now in S. Dakota. The E. part of the Dakotas was included in the region allotted to Minnesota on its creation as a territory, 1849. In 1861 the Territory of Dakota was created, extending from lat. 42° 28' to 49° N. and from Minnesota to the Rocky Mountains. From this tract Idaho, Montana, and Wyoming were set off as territories. The states of N. Dakota and S. Dakota were admitted to the Union November 2, 1889.

Northeast' Passage, communication by sea from the Atlantic to the Pacific along the N. coasts of Europe and Asia; sought in vain for more than three centuries; first accomplished by Baron Nordenfjöld, 1878-79.

North'er, cold, piercing wind occurring in Mexico and Texas, coming on with great suddenness and following warm and moist weather; usually advances with a bar of stratus cloud, and strikes the observer when this cloud is about 45° above his horizon; may be either wet or dry, the latter being more frequent; occur forty or fifty times a year, generally between September and May.

North'ern Crown. See CORONA BOREALIS.

Northern Lights. See AURORA.

Northern Nige'ria. See NIGERIA.

North'field, town in Franklin Co., Mass.; on the Connecticut River, where the states of Massachusetts, New Hampshire and Vermont meet; 50 m. N. of Springfield; birthplace of Dwight L. Moody, who made it a center of Christian work and influence by founding (1879) a seminary for young women of ability and earnest purpose. Bible Conference held here every summer. At Gill, 4 m. from Northfield, is Mount Hermon School for Boys, founded 1881 by Mr. Moody and friends. The business interests are chiefly agricultural.

North Hol'land Canal', waterway extending from Buiksloot, opposite Amsterdam, to the Helder, 51 m.; is 124 ft. broad at the surface and 31 ft. at the bottom, and is available for vessels drawing 18 ft. of water.

North'men. See NORMANS.

North River. See HUDSON RIVER.

North Sea, or Ger'man O'cean (called the WEST SEA by the Danes), extensive arm of the Atlantic, between Great Britain and the continent of Europe; greatest length about 700 m.; breadth, 400 m.; communicates with the Atlantic on the N., with the English Channel by the Strait of Dover on the SW., and with the Baltic by the Skager Rack on the E.; shores are indented by numerous bays, inlets, and estuaries. Besides the Orkneys and the Shetlands, there are many islands, all on the coasts of Norway, Denmark, Germany, and Holland. The Bell rock and May rock are the only islands of the North Sea on the coast of Great Britain. The average depth of the sea is about 30 fathoms, but toward the Norwegian side the soundings increase to 190 fathoms. The North Sea is traversed by several extensive

banks. Several thousand people are occupied in the fisheries, and the quality of the fish has long been celebrated. On October 24, 1904, the Russian Baltic squadron under Rear Admiral Rojestvensky, hastening to the relief of Port Arthur and later almost annihilated in the Sea of Japan, opened fire on a fleet of British fishing craft here, alleging a belief that Japanese torpedo boats were among the trawlers. The affair led to an international investigation and the payment by Russia of damages.

North Sea, or Am'sterdam Canal', waterway connecting Amsterdam, Holland, with the North Sea. Such a canal had been proposed even before making the N. Holland Canal. That work answered the existing exigencies, but was found not equal to those arising from the modern developments of commerce. The project of a direct water communication with the North Sea was revived, 1854; construction authorized, 1863; canal opened for traffic, 1876. The project involved the shutting off of Lake Y at its E. end from the Zuyder Zee by a dam 1 m. in length with locks adequate to the purposes of all the coasting trade of the Zuyder, and of the lighter draught vessels for the North Sea, which still may enter by the Helder. The formation of this dam and the construction of its triple locks, founded by means of a cofferdam 550 ft. in diameter in 18 ft. of water on 9,000 piles, are among the most remarkable works of modern hydraulic engineering. The canal is 23 ft. deep and 14½ m. long. An artificial harbor was constructed at the sea-entrance. The waters of the Y and Wijkmeer are drained into the canal, reclaiming 13,142 acres of arable land. The works cost about \$15,000,000, and make Amsterdam practically a seaport.

Northum'berland, John Dudley (Duke of), 1502-53; British statesman; b. England; commanded the English squadron during the war with France, 1544-45; was an executor of the king's will, 1547; intrigued against the protector Somerset, 1549; acquired chief power in the council, 1550; created Duke of Northumberland, lord high steward, and earl marshal, 1551; married his fourth son, Lord Guilford Dudley, to Lady Jane Grey, May, 1553; prevailed on Edward to adopt Lady Jane as his successor, June; placed her on the throne, July 10th; and was executed as a traitor.

Northum'bria, largest kingdom of the Saxon Heptarchy, embracing the region N. of the Humber, and at one time extending to the Forth in Scotland. It was formed into a kingdom by Ida abt. 547 by the union of Bernicia and Deira; divided at the death of Ida, but reunited under Ethelfrith, 593; became the leading British power under Oswald, 634-42, and was extinguished by Egbert, 827, when the name of England was first applied to the kingdom resulting from the aggregation of the minor states to Wessex and Northumbria.

Northwest'ern University, coeducational institution in Evanston, Ill.; organized, 1850, under the auspices of the Methodist Episcopal Church; comprises a college of liberal arts, medical school for men and one for women, law school, dental school, school of pharmacy,

and theological seminary (Garrett Biblical Institute); college of liberal arts and theological seminary in Evanston; other schools in Chicago; campus, at Evanston includes 50 acres along the shore of Lake Michigan; university had (1910) 449 professors and instructors, 4,830 students in all departments, about 142,000 volumes in library, scientific apparatus valued at \$326,000; grounds and buildings, \$2,713,000; productive funds, \$4,296,000.

Northwest Passage, communication by sea from the Atlantic to the Pacific along the N. coasts of the American continent; long sought by navigators; first accomplished by Sir R. MacClure, 1850-51.

Northwest Provinces, former name of a great political division of British India; now called the United Provinces of Agra and Oudh.

Northwest Territories, all that portion of British N. America outside the provinces of Ontario, Quebec, Nova Scotia, New Brunswick, Manitoba, British Columbia, Alberta, Saskatchewan, Prince Edward Island, and the colony of Newfoundland; bounded on the N. by the Arctic, E. by Labrador and the Atlantic, S. by parts of the Dominion of Canada, W. by Alaska; area, 1,922,735 sq. m.; was known as the Hudson Bay Territory till 1870, when it was acquired by the Dominion. The principal rivers are the Mackenzie, emptying into the Arctic, and the Churchill and Nelson, emptying into Hudson Bay. A very large part of the region is unexplored; most important timber is spruce; large coal deposits, as well as lignite and petroleum, exist throughout the territories; iron, gold, silver, galena, and copper occur.

Northwest Territory, name formerly applied in the U. S. to the tract of land included between the Mississippi and Ohio rivers and the Great Lakes, comprising the present States of Ohio, Illinois, Indiana, Michigan, and Wisconsin. The original states had ceded it to the National Government, which provided for its administration by the ordinance of 1787.

Norumbega, name given by early French explorers to a country, river, and city supposed to be somewhere in the E. part of the U. S. or Canada, and said to have been discovered by Verrazano, 1524. The site of the city was given on a map published at Antwerp, 1570. In 1604 Champlain ascended the Penobscot, supposing it to be the Norumbega, but after going 22 leagues discovered no indications of a city or of civilization, except a cross in the woods. Norumbega was by some writers thought to embrace all New England, while Lok, 1582, seems to have believed that the Penobscot formed its S. boundary. Prof. Eben N. Horsford, of Cambridge, Mass., in his "Discovery of the Ancient City of Norumbega," claims to have found the precise site of the ancient city, and locates it with absolute confidence on the Charles River in Massachusetts, at its junction with Stony Brook near Waltham. He makes Norumbega identical with the Vinland of the Norsemen, claiming that Norumbega is an Indian corruption of *Norvegr* (Norway), and

that it has borne that name among the aborigines ever since the Norse explorers in the tenth and following centuries made their headquarters there. He takes Norumbega to be the name the explorers did not bestow, but found. So thoroughly convinced was he of the correctness of his theory that he built on the site which he identified as Norumbega a tower in commemoration of the Norse discoverers and colonists.

Norway, kingdom of Europe; W. part of the Scandinavian peninsula; bordering on Russia and Sweden on the E., and surrounded on all sides by the sea; length SW. to NE., 118 m.; extreme breadth, 204 m.; coast line, including the fiords, 10,500 m.; area, 124,129.7 English sq. m., three fourths of which is uninhabitable; pop. (1907) est. at 2,330,364; largest cities, Kristiania (capital), Bergen, Trondhjem, Stavanger, Drammen, Kristiansand, Fredrikstad. Hammerfest is the extreme N. city in the world. Surface practically covered with mountains, there being no well-defined chains, but numerous table-lands, among which individual peaks are irregularly scattered. Giant Mountains, highest in Europe N. of the Alps, have peaks exceeding 8,400 ft.; glaciers numerous; the Jostedalstrø has an area of 350 sq. m. Fiords the most characteristic natural features, these being long, narrow arms of the sea, filling excavations made by glacial ice; the Sogne and Hardanger the most famous; the thirty larger ones have an average length of 60 m.; rivers numerous, but owing to falls and rapids, only a few navigable; Glommen in the SE., the principal one; lakes, in reality expansions of river beds, numerous.

The whole coast, excepting in two short stretches, has a chain of islands called *Skjærgaarden*; between them and the mainland a deep channel, affording shelter from the ocean storms; most important of these 50,000 islands the Lofoten (Loffoden) group, within the Arctic circle. Climate milder than that of any other country in the same latitude, owing to the Gulf Stream; interior regions have a cold winter and hot summer; coast regions, a mild winter and cool summer; only the more interior fiords freeze; barley ripens as far N. as 70° N. lat.; mean annual temperature of S. part of country and coast, 44° F.; at Karasjok (Finmark), 26°; rainfall greatest on W. coast—77 in. Mineral products include silver, copper ore, pyrites, iron ore, coal, apatite, marble, feldspar; also gold, nickel, and zinc in small amounts. Soil not very fertile except in a few of the valleys; chief products, oats, wheat, barley, rye, potatoes. Cattle raising and dairying important industries. Large herds of semi-domesticated reindeer are kept by the Lapps. Chief manufactures, lumber from the extensive pine forests, wood pulp, wooden ware, foundry products, textiles, leather, cordage, cellulose, malted liquors, paper, glass, pottery, tobacco, shipbuilding extensively carried on. Fisheries of the coast, rivers, and lakes a source of large revenue. Chief exports, timber, wood pulp, cellulose, animal produce, skins and tallow, mainly sent to Great Britain, Germany, and Sweden; yearly value imports about \$107,000,000; exports about \$78,000,000.

State religion, Evangelical Lutheran, but all other sects (except Jesuits), as well as the Jews, tolerated; number of dissenters about 55,000. Chief educational institutions, Univ. of Kristiania, with about 1,000 students; six public normal schools, and four private; education compulsory. Constitution (Grundlov) vests the legislative power in the Storting, assembling annually; right of veto over laws passed possessed by the king, but only for a limited period; command of land and sea forces, and the making of appointments, in the hands of the king; Storting, composed of 123 representatives, is divided into two houses, the Lagting and Odelsting, the former comprising one fourth of the members of the Storting. The executive is represented by the king, exercising authority through a council of state, composed of a minister of state and at least seven councillors; administrative division is into twenty districts, each governed by a chief executive functionary, viz., the towns of Kristiania and Bergen, and eighteen amts (counties). Army, a national militia, somewhat resembling that of Switzerland; various arms are formed into corps, each consisting of one unit of line, one of landvärn, and one of landstorm; nominal strength of active army, 80,000 men; of the landstorm and its reserve, 95,000; navy very small, including only four or five armored vessels.

The Norwegians, belonging to the Scandinavian branch of the Teutonic race, are hardy, of great endurance, and usually of large stature. Danish is spoken by the educated classes; the peasantry have various dialects. Up to 872 the history of the country is covered with a mantle of mythology. In that year numerous petty kingdoms were united by Harold Fairhair. Christianity was introduced by Olaf Tryggvedon and Olaf the Saint, 1030. Viking expeditions were numerous, and abt. 911 the Norsemen obtained that part of France afterwards called Normandy. From 872 to 1319, with the exception of three short intervals, Norway was ruled by kings of the Fairhair (Haarfagr) line. Under Haakon the Old (1217-63) Norway reached the height of her power as a state. Magnus, son of Haakon, compiled a code of laws for the whole kingdom that remained in force four hundred years.

Magnus Smek, son of Duke Erik of Sweden, was king of both Norway and Sweden, 1332-55, when Norway again became independent, although only nominally. Haakon VI married the Danish princess Margaret. Their son Olaf was, 1376, elected King of Denmark, and on the death of the father, 1380, also became King of Norway. His successor, his mother, by the Peace of Colmar, 1397, effected a union with Sweden, Sweden revolted, 1523, but Denmark and Norway remained united until 1814, when Frederick VI of Denmark was forced to cede Norway to Sweden as remuneration for the latter's participation in the alliance against Napoleon. The Norwegians, however, declared their independence and adopted a free constitution. A union with Sweden was agreed to, November 4, 1814, but only on the basis that Norway's equality in the union should be unconditionally recognized. Norway declared the

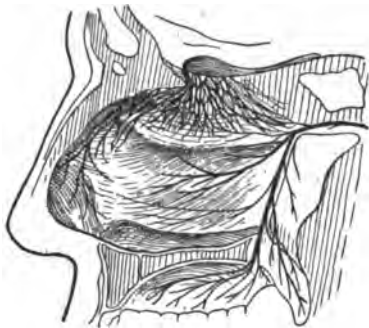
union dissolved, June 7, 1905; a mutual agreement for the repeal was signed, October 26th, and Prince Charles, son of King Frederick of Denmark, was elected king, November 18th, and assumed the title of Haakon VII.

Norwich (naw'r'rij), capital of Norfolk Co., England; on the Wensum; 114 m. N.E. of London; is a large, old, and prosperous town; irregularly built, but full of specimens of early architecture. The cathedral, founded 1096, still retains its original Norman plan to a great extent, but the spire (fourteenth century), 315 ft. in height, is mixed Decorated and Perpendicular, while the cloisters (1297-1430) are mainly Decorated in style; and there are remaining two fine arches of the Early English Lady Chapel (demolished abt. 1580). The castle, at the highest point of the city, originally extended as far as the market place, but the keep is now the only part remaining; is a museum. Among nearly fifty churches, mostly dating from the fifteenth century, St. Peter Mancroft is perhaps the finest parish church in England. There are manufactures of worsted, silk, and cotton fabrics, especially crapes; also of mustard, starch, ornamented ironware, and shoes; and breweries and nursery gardens in the outskirts. Norwich was the Caer Gwent of the Britons, and the Venta Icenorum of the Romans. It was often plundered by the Danes, and, 1216, was sacked by the French dauphin, Louis. In 1336 several thousand Flemish weavers settled at Norwich, and during the latter part of the sixteenth century there was a large influx of Dutch and Walloon refugees, who did much to foster manufactures. Pop. (1911) 121,493.

Norwich (naw'r'wich), one of the capitals of New London Co., Conn.; on the Thames River; 35 m. S.E. of Hartford; site purchased from Indians, 1659; settled, 1680; received city charter, 1784; in a valley surrounded by hills; has excellent water power, and is noted for its manufactures, which include cotton, silk, and woolen goods, paper, firearms, wood-working and other machinery, printing presses, envelope printing presses, rolling-mill and foundry products, stoves and furnaces, leather belting, rope, harness, hosiery, nickel goods, flies, and corks. Pop. (1910) 20,367.

Nose, that part of the body in which the organ of smell is located, and through which, in health, air enters to the lungs. The nose is built upon a triangular framework of cartilage and bone. Its passages are lined throughout with mucous membrane, which warms and moistens the air that is breathed in and also intercepts some of the dust which the air carries. The nasal passages are connected with the ears by the Eustachian tubes, and the tear ducts enter the nose from the inner side of each eye. These connections account for the temporary deafness and swollen eyes during a cold. In the upper part of the nostrils the olfactory nerve is distributed, and its fibers pass upward through small openings in the ethmoid bone to the olfactory bulb underneath the brain. The nose is subject to many diseases. The skin may be affected with lupus,

or the cartilage and bone may be destroyed by tuberculosis or other diseases. The nasal mucous membrane is very susceptible to



NOSE. VERTICAL FORE-AND-AFT SECTION THROUGH ONE NOSTRIL SHOWING THE OLFACTORY NERVE COMING DOWN FROM THE OLFACTORY LOBE AND THE NERVE OF COMMON FEELING BEHIND.

catarrh, and is often injured in children by pushing buttons or other objects up the nostrils. See SENSATION; SENSES.

Nostradamus, Michel de, 1503-66; French astrologer, of Jewish parentage; b. St. Rémi; invented a powder for the cure of the plague, and abt. 1547 began to believe in his own prophetic powers; published seven "Centuries" of quatrains, and, 1558, a new edition, dedicated to King Henry II, whose death was foretold therein; made physician to Charles IX, and consulted by all classes for the cure of diseases and for divination.

No'ta, Alberto, 1785-1847; Italian author of comedies; b. Turin; librarian, first to Prince di Carignano, then to King Carlo Alberto; occupied successively many offices in the civil magistracy; called "the Piedmontese Goldoni"; comedies include "I Primi Passi al mal Costume," "La Fiera," "L'Irrequieta," "Il Progettista," "L'Oppressore e l'Oppresso," "La Lusinghiera," "Educazione e Natura."

Not'ables, in France, persons of noble birth or social distinction, from whom the members of the Assembly of the Notables were chosen. This body, which was first convened by Charles V, owed its origin to the desire of the monarch to secure a more serviceable instrument of despotic power than the older States General. As its members were dependent on the crown, they generally consented to what the king proposed. The last Assembly of the Notables met 1788. In the previous year it had accepted in part the reforms proposed by the government, but now it refused to listen to the demand for the double representation of the third estate in the States General. It opposed all innovations, and was dissolved December 12, 1788.

No'tary Public, or simply Notary, officer appointed to draw up and attest deeds and contracts, and perform other similar functions. The name and office are of Roman origin, but the *notarii* were mere scribes, who wrote out

the agreements of those who employed them. Like the *notarii* were the *tabelliones forenses*, who drew up legal documents and statements to be sent to the courts or presented to the civil authorities. In imitation of these Roman officers, the Frankish kings created notaries, while during the Middle Ages notaries were appointed directly by the popes or emperors, or under their immediate authority. Prior to the revolution notaries were invested in France with a qualified judicial character. They are now public officers, but derive their authority from and represent rather the state than the courts. Notaries were known in England before the Conquest. Their authority there extends to the drawing of deeds relating to real and personal property, to protesting bills of exchange, authenticating and certifying copies of documents, and the attestation of instruments going abroad. English notaries have always considered themselves competent to administer oaths and affirmations. The functions of notaries in the U. S. are similar to those exercised by the same officers in England, though limited in practice to the attestation of mercantile writings and the protestation of bills and notes. A notary's seal must usually attest the execution of important legal documents. They are usually commissioned by the executives of their states, and derive their particular powers from statute provisions.

Nota'tion, in mathematics, a conventional method of representing quantities and operations by means of symbols. A simple and comprehensive system of notation is essential to every science, but in no branch is a complete system more necessary than in mathematics. Each department of mathematics has its own notation; here is considered only the notation of arithmetic, or the method of writing numbers. There are at present in general use only two systems of arithmetical notation, the common, or Arabic, system and the Roman. In the first the following figures, expressing values regularly increasing by one from nothing to nine, are used: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9. These figures, taken separately, are called *digits*. The first one, named *naught*, is also called a *cipher* or *zero*; it stands for no number. The remaining ones are called *significant* figures. All integral numbers are expressed by writing the proper digits in a line. The digit on the right is said to stand in the *first* place, the one preceding this in the *second* place, the next preceding in the *third* place, and so on. If a digit stands in the first place, it expresses simple units or *ones*; if in the second place, *tens*; if in the third place, *hundreds*; the value of the unit in any place is always ten times that of the unit in the next lower place. The denominations above billions are trillions, quadrillions, quintillions, etc., deriving their names from the Latin numerals.

There is an unfortunate ambiguity in the use of the terms billions, trillions, etc. In the French system, which is generally used in the U. S., each of these denomination is 1,000 times the preceding one; but in the English system it is 1,000,000 times, the billion being a million millions. In the Roman method

seven capital letters are used as numerals; these and the values they express are:

Letters, I, V, X, L, C, D, M
Values, 1, 5, 10, 50, 100, 500, 1000

Any other number is expressed by a combination of these letters on the principle that such a combination represents the sum of the values of its constituent letters, these being arranged from left to right in order of value, and the use of the same letter five times or more being avoided by using letters of greater value; but when the same letter would occur four times, it is customary to employ the sub-principle that whenever a letter precedes one of greater value the value of the two is that of their difference instead of their sum. Thus III denotes 3; VI, 6; LX, 60; XC, 90; XIV, 14; and MDCCLXXVI, 1776. This system is used only for dates, headings of chapters, and the like.

NOTATION, in music, is the mode or system by which musical thoughts are represented in writing, including all the signs, characters, figures, and arbitrary marks necessary to render such thoughts intelligible. The system now in use is mainly a product of the last three or four centuries, and in all civilized nations musical symbols are the same. In ancient times the recording of musical ideas was a subject of perplexity. The earliest signs used seem to have been the letters of the alphabet, which were sometimes placed erect, sometimes inverted, mutilated, commingled, or cast into various fanciful forms, so that by degrees more than 100 of such characters came into use. As late as the thirteenth and fourteenth centuries numberless crooked marks, loops, curves, hooks, wavy lines, and other signs, besides the dots, were used with the single straight line. The introduction of several lines with their spaces, and notes of fixed form and duration, was the next important step. The lines were at first only four in number. To indicate the pitch of the notes two clefs were used—one to mark the place of middle C, and the other that of the F below. These clefs were not permanently fixed, but were placed on such a line as would serve most conveniently to keep the notes within the bounds of the stave and the spaces above and below.

The stave now in universal use consists of five lines, and to each stave is prefixed a clef to designate the various degrees of acuteness or gravity of the notes employed. Of these clefs that of F for the bass and that of G for the upper parts are of most frequent use in modern music, the C clef being reserved for certain orchestral parts, and also occasionally used for the tenor and alto in church music. The round-headed form of notes is now exclusively used, the old square breve seldom appearing except in the music of the Church. The semibreve is now taken as the standard of unity or the note of longest duration, but the extent of that duration is determined by the will of the composer or performer. The actual speed of a piece of music is indicated by the regulative terms or signs at the beginning (see METRONOME), or is left to the discretion of the

performer; but in all cases the time given to the semibreve determines the time of each minim, crotchet, quaver, etc. The use of bars was not general till about the middle of the seventeenth century, and to the same period is to be referred the grouping of quavers, semiquavers, etc., by ties connecting their stems. See NOTE.

Note, in music, the character by which a tone is recorded and represented to the eye. One of the characters or notes in ancient music, and the longest in point of duration, is the large. The notes formerly in use were, in the order of their respective time values, the large, the long, the breve, and the semibreve. The relative duration of these notes was equivalent in proportion to 8, 4, 2, and 1, the large being equal in time to two longs, or four breves, or eight semibreves; the long, to two breves or four semibreves; and the breve, to two semibreves. In the absence of any positive rule for the translation of ancient notes into their equivalents under the modern system, the most common mode followed by musicians is to render the long by a semibreve, the breve by a minim, and the semibreve by a crotchet. In a less accurate sense, the term is often used for the sound of which it is the representative, as when we say a high note or a low note, meaning a high or low sound. The leading note is the seventh degree of the major scale, or the semitone next below the octave. See NOTATION.

Notes. See NEGOTIABLE INSTRUMENTS.

No'tice, legal term used with varying significations. At times it is synonymous with knowledge, as when a court is said to take "judicial notice" of matters of general knowledge. Again, it designates the act, means, or instrument by which information is conveyed—e.g., notice to quit, notice of dishonor, notice of acceptance of proposals, notice in legal proceedings. It is also employed as a technical term to denote information concerning a fact, which "is regarded as equivalent in its legal effect to full knowledge of the fact, and to which the law attributes the same consequences as would be imputed to knowledge." To illustrate: If a person buys and receives property on credit by false representations concerning his financial ability, the vendor on discovering the fraud may rescind the sale and retake the property from the vendee, or from any purchaser of the vendee having knowledge of the fraud. This right is equally available against a second purchaser, who had notice merely of the fraud and not knowledge.

No'tion, concept or general idea; word used mainly in logic, and generally made to include the name given to the class of objects to which a concept or idea has reference. Thus "horse," considered as a "concept" or "idea," is the mental state or inner meaning of the thinker, while "notion" includes the name horse by which this "concept" or "idea" is expressed in reference to the object of thought. See CONCEPT.

Notopter'idæ, family of teleocephalous fishes of the suborder *Physostomi*, distinguished by

many peculiar characters. The family is composed of fresh-water fishes, attaining considerable size, and peculiar to the fresh waters of India and Africa.

Nott, Eliphalet, 1773-1866; American educator; b. Ashford, Conn.; pastor at Albany, 1798-1804, acquiring celebrity as a public orator; president of Union College, Schenectady, N. Y., 1804-66; made several inventions in stoves and other apparatus for warming buildings; gave large sums for the endowment of Union College and the foundation of scholarships for poor students.

Nottingham, Heneage Finch (first Earl of), 1621-82; English jurist; b. Gastwell; called to the bar, 1645; member Convention Parliament, 1660; made Solicitor-general, 1660; Attorney-general, 1670; Lord High Chancellor, 1675; took part in prosecution of the regicides; presided at trial of Lord Stafford; famed in his own time for powers of oratory; his portrait was given by Dryden under the character of *Amri* in his "Absalom and Achitophel."

Nottingham, capital of Notts Co., England; on the Leen, near junction with the Trent; 126 m. NNW. of London; formerly irregularly built, but appearance has undergone a great change, owing to improvements. On the summit of a rock rising abruptly from the river stands the castle (1674-83), built on the site of a Norman fortress, now an art museum. Close by is St. Mary's Church, a cruciform structure in the Perpendicular style, with a fine tower, and a handsome market place, 5½ acres in extent, at one end of which is the exchange. Among modern erections are the Guildhall and the University College, with its splendid range of buildings. The high school has a large income from endowments. Among modern churches may be mentioned the Roman Catholic Cathedral of St. Barnabas, designed by Pugin, in the Early English style. Nottingham's manufactures of cotton and silk hosiery and of bobbinet and lace are most important; bicycles, baskets, cigars, and needles are also made, and iron and brass works, malting business, and trade in grain and cattle are extensively carried on. After having been occupied some time by the Danes, it was restored and reoccupied by Edward the Elder, who rebuilt the fortress and threw a bridge over the Trent. Parliaments met here, 1334, 1337, and 1357. In 1642 Charles I began the Parliamentary war by setting up his standard here. Pop. (1911) 259,942.

Noun, in grammar, a name or appellation of something, whether it be a substance, creature, quality, action, statement, or any other entity, concerning which name a statement may be made in a sentence. A verb is the name of something as truly as is a noun. The word *talk* is the name of an action. In the sentence, *Talk is cheap*, it is a name concerning which a statement is made; so in the sentence, *It is all for talk*, it is a noun by virtue of its function. In the sentence, *They talk*, a word of like form, if not identically the same word, is also the name of an action, but with a

different function. The adjective is the name of an attribute; so is a noun. In the sentence, *White is a color*, we call *white* a noun by reason of its function, while in *iron chain*, *stone wall*, names which commonly appear as nouns serve in the rôle of adjectives. In the sentence, *There are too many ifs and ands*, the conjunctions *if* and *and* are nouns by virtue of their function. The distinguishing characteristic of a noun, therefore, is not the fact that it is a name, but its function as furnishing subject-matter for statement in the sentence.

Nouns are either concrete, as names for substance, or abstract, as names of attributes, actions, or phenomena. Concrete nouns are either common or proper. A common noun is an appellation which may be shared by all the individuals of a class or applied to the entirety of a material, as *man*, *tree*, or *water*, *wood*. A proper noun is permanently and definitely appropriated to mark an individual person or thing. The name *city* may be applied to any individual of a class, but *Chicago* has been appropriated, like a tag or a trade-mark, to designate one certain individual. Proper names may generally be traced historically to common names which, from persistent connection with individuals, have lost their meaning and become purely symbolic instead of representative; thus *Newcastle*, *Neuburg*, *Neuchâtel* were originally common names, a *new castle*, and the name *Smith*, a class name, *smith*. Proper nouns may in their turn become common when extended to a class of individuals sharing the prominent characteristic of the original holder of the name; thus *academy*, *czar* (Cæsar), *palace*, a *Napoleon*—i.e., an autocrat; a *Judas*—i.e., a traitor. Common nouns may be divided into material nouns, as *water*, *iron*, and class nouns, and these into individual nouns, as *man*, *house*, and collective nouns, as *people*, *crowd*, *army*.

Novalis (nō-vā'lis), pen name of FRIEDRICH VON HARDENBERG, 1772-1801; German author; b. Wiedersdorf, Saxony; studied jurisprudence, chemistry, and mathematics at Jena, Leipzig, and Wittenberg; attended the mining school of Freiberg; held a place at the salines of Wessensfeld, of which his father was director; works consist of an unfinished romance, "Heinrich von Ofterdingen," and a number of lyrical poems, especially hymns, and fragments of philosophy and religion. Besides the Bible, his favorites were Böhme, Zinzendorf, and the Neoplatonists; the deep religious enthusiasm of his heart is often singularly mixed with mystical and fantastical flights of imagination.

Novara (nō-vā'rā), capital of province of same name, Italy; 30 m. W. of Milan; in the great fertile plain between the Sesia and the Po. The cathedral rivals St. Ambrogio of Milan in antiquity, having been founded 400 A.D.; is celebrated for its splendid high altar, its sculptures by Thorwaldsen, and its archives, and for its music. Novara is the largest grain market in Piedmont, and its manufactures include cotton and linen cloths, starch, candles, sausages, earthenware, hides, etc. The

city is of pre-Roman origin; its inhabitants were noted for their industry in the time of Pliny; and it has played a considerable part in the history of N. Italy. Early in the twelfth century it was taken and burned by Emperor Henry V. In 1513 it was the scene of a battle that ended in the expulsion of the French from Italy; 1821 the constitutional troops were here defeated by the Austrians; and here again, 1849, the Austrians triumphed over the Sardinian army. Pop. (1907) 45,248.

No'va Sco'tia (Latin, **NEW SCOTLAND**), originally **ACADIA**, province of Canada; consisting of the peninsula of Nova Scotia proper and the island of Cape Breton, separated from the mainland by the Gut of Canso; extreme length, 350 m.; breadth, 50 to 100 m.; total area, 21,428 sq. m.; pop. (1911) 492,338; chief towns, Halifax (capital), Dartmouth, Truro, Yarmouth, Lunenburg, Spring Hill, Amherst, New Glasgow, Pictou, N. Sydney, Windsor, and Liverpool. The E. half of the province was settled almost wholly by Scotch, the center and W. by English, Scotch, Irish, American loyalists, and a few Canadian French. Lunenburg Co. is almost wholly German. The peninsula is joined to New Brunswick by the Isthmus of Chignecto, 13 m. wide. The coast waters are the Gulf of St. Lawrence on the N., the Atlantic on the NE., E., and S., and the Bay of Fundy on the W. The province is intersected by chains of lofty hills and indented with deep bays and noble harbors all along its coast. On the Atlantic side there are twelve, capable of affording shelter to the largest ships, while every few miles along the shore are smaller harbors, easy of access, forming an admirable shelter for hundreds of fishing vessels. The shore is studded with small islands. The interior is covered with a network of lakes, which find their outlet in numerous small rivers, most of which are navigable for small vessels for from 5 to 12 m. Chief rivers, the Shubenacadie, Avon, Annapolis, LaHave, Musquodoboit, and St. Mary's. The surface is generally hilly, but greatest elevation only 2,100 ft.

Climate remarkably temperate; mean temperature of summer about 61°, of winter 23°; average precipitation of water (rain and snow) per annum, about 45 in.

Dike lands about the Bay of Fundy admirably adapted to the production of hay; interval lands all over the province rich and productive; the upland, of varying degrees of fertility. Chief products, wheat, barley, oats, potatoes, hay, maize, rye, buckwheat, apples, pears, plums, cherries, and all the small fruits of temperate climates grown in abundance. Dairying and the raising of sheep for wool important industries. Industrial establishments include lumber mills, cotton factories, sugar refineries, smelting works, rolling mills, steel works, glass works, woolen mills, tanneries, shoe factories, canning factories, agricultural implement works, gunpowder and dynamite works and paper mills. Shipbuilding is extensively carried on; the cod, herring, mackerel, lobster, and other fisheries employ a large number of vessels and men. Mineral products

include bituminous coal in great abundance, bituminous shale, rich in petroleum; gold, iron, copper, lead, silver, manganese, limestone, marble, gypsum, freestone, agates, jaspers, amethysts, and other precious stones.

Principal educational institutions: A provincial normal school at Truro; Dalhousie College and Univ. (nonsectarian), Halifax; King College and Univ. (Episcopal), Windsor; Acadia College (Baptist), Wolfville; St. Francis Xavier (Roman Catholic), Antigonish; St. Ann's (Roman Catholic), Digby County, and Presbyterian Theological College, Halifax. Nova Scotia was visited by the Cabots, 1497; first settled by the French under de Monts, 1604, when Nova Scotia, New Brunswick, and a part of Maine were called Acadia; settlement of Port Royal attacked by English colonists of Virginia under Sir Samuel Argall, 1614, who captured the place and claimed the territory as belonging to England. For many years Acadia was a battle field for the French and English. In 1621 James I granted the whole peninsula to Sir William Alexander, and it then was for the first time called Nova Scotia. After many years of war it was ceded to Great Britain by Treaty of Utrecht, 1713. In 1755 the Acadians were expelled from King's and Annapolis cos. The struggle then went on for the island of Cape Breton; that was ceded to Great Britain by Treaty of Paris, 1763. Nova Scotia joined the Dominion of Canada, 1867.

Novatians, schismatical sect which originated in the third century, so called from their founder, Novatian, a priest at Rome, who held that persons who had committed the more grievous sins, and especially those who had denied their faith during the Decian persecution, ought not to be received again into the Church. In 251 his partisans set him up as Bishop of Rome, in opposition to Pope Cornelius. The sect survived its founder about three centuries.

Novation, law term from the Roman civil law, signifying the creation of a new debt or contract in substitution for an old one. To a novation there are three parties. It takes place when A owes B, and C owes A, and A transfers to B in payment of his debt C's debt to him, A. The effect of this is that A is no longer the debtor of B nor the creditor of C; and B is no longer the creditor of A, but has become the creditor of C; and C is no longer the debtor of A, but has become the debtor of B. The original liabilities must be extinguished by the novation, and their discharge is a sufficient consideration for the new liabilities. The transaction may be oral only.

No'va Zem'bla, two large islands separated by a narrow strait, forming an enormous crescent in the Arctic and separating the Sea of Barents from Kara Sea, N. of NE. Russia and NW. Siberia; belonging to Russia; area, 34,500 sq. m.; uninhabited, but visited during the summer by whalers and hunters of bears and reindeer.

Nov'el, in English, a fictitious prose narrative, which describes real life, past or present,

the term romance being applied to narratives of a more or less fantastic character. Such narratives are found in many early and remote literatures; there are Chinese, Japanese, and Egyptian novels. In Roman literature, the "Golden Ass" of Apuleius is the only survival of a form of story that was very common, and the "Satiricon" of Petronius gives a representation of the corruption of imperial Rome. The modern novel, however, arose from the collections of stories that appeared in Italy in the fourteenth century, the best of which is the "Decameron" of Boccaccio (1353), a collection of 100 tales from various sources. Another source of the modern novel is found in the Spanish romances, as well as in the realistic picaresque (from "pícaro," a scamp), novels. The extravagant romances, such as the "Amadis de Gaul," expressed the most serious ideals of the Spaniards; but the picaresque novels—the most famous of which was "Guzmán de Alfarache," by Mateo Aleman—by the representation of evil deeds and ridiculous adventures of unromantic heroes of low birth, became not merely rivals, but criticisms of the ideal romances, which finally received their death blow by "Don Quixote" (1605–15). France then took up the fading romance of Spain, and French fiction produced a host of heroic and pastoral novels of ponderous size and inflated incident. But the realistic novel also crossed the Pyrenees, and Le Sage's "Gil Blas" shows its dependence upon its Spanish prototypes. In England the Spanish romances were most popular, and the picaresque novels inspired crude imitations in T. Nash's "Jack Wilton" and in "The English Rogue" (1665–71). The most important forerunners of the English novel were Swift's "Gulliver's Travels" and De Foe's "Robinson Crusoe." Richardson, in his "Pamela," "Clarissa Harlowe," and "Sir Charles Grandison," indicated the importance of the citizen as contrasted with the noble, and preached virtue—prosaically it seems to us, but eloquently it seemed to his readers. Fielding, wearied by Richardson's inartistic praise of virtue, described people as he saw them, not as moralists might wish them to be. His "Joseph Andrews" is almost a caricature of "Pamela." "Tom Jones," his greatest work, shows the Spanish influence, and this may also be distinguished in the novels of Smollett. In Sterne there is a combination of humor and pathos, delicate psychological study, and total disregard of incident. In Goldsmith's "Vicar of Wakefield" there is the graceful optimism, the exquisite form, of the best work of the eighteenth century. Horace Walpole's "Castle of Otranto" (1765) and Mrs. Radcliffe's "Mysteries of Udolpho" (1794) introduced a gloomier form of romance. In France, Rousseau's "Nouvelle Héloïse" (1761) opened a larger study of the world, but its revolutionary spirit was replaced, in England, by the amusing pictures of life by Miss Burney, tales by Jane Austen, and unimpeachable morality taught by Miss Edgeworth. Scott made over not only the art of novel writing, but that of writing history. In France we see his influence in Dumas and Hugo. Dickens studied social abuses, and often hid direct practical teaching

under a mask of raillery. Thackeray drew pictures of the new polite society, and his acute observations and gentle ridicule were mis-called cynicism. Bulwer combined romanticism and the study of the present with more popularity than success. In France, Balzac made a profound study, half romantic and half real, of the motley society he saw about him. George Sand used the novel to assert the rights of women, and brought the country people into fiction.

J. F. Cooper in the U. S., inspired by Scott, had drawn romantic pictures of the red Indian. Hawthorne, with far more literary art and a subtler imagination, described New England life in the past and in the present, and also Italy in "The Marble Faun." All his pages were lit by the last and, in the estimation of many, the most beautiful rays of romanticism, now approaching its end. Mrs. H. B. Stowe's "Uncle Tom's Cabin," with its vivid drawing of the wrongs of slavery, is perhaps more noteworthy as a campaign document than as a work of art. Zola, the most important of later French novelists, advocated the extreme realism, and the reaction against the extravagances of romanticism has been aided by the work of the Russians, Turgenieff and Tolstoy.

Novem'ber (originally the ninth month of the Roman year), the eleventh month of the year, containing thirty days.

Novgorod (nóv'gō-ród), or **Novgorod Velikii** (vā'lē-kē), "the great," capital of government of Novgorod, European Russia; on the Volkhov, near Lake Ilmen; 110 m. SSE. of St. Petersburg; was in the fifteenth century the largest and most important town in N. Europe; made the capital of the Russian monarchy, 862; founded in that year by Rurik, on the thousandth anniversary of which event a magnificent monument was erected in the city, which otherwise is rather poorly built; now entirely dependent for its trade on St. Petersburg and Archangelsk. Pop. (1900) 26,972.

Nov'ice, candidate for admission into a religious order who has not yet taken the vows, but is passing through a period of probation. Novices must have attained the age of puberty, else the vows taken by them afterwards are invalid. No married person can be admitted except by the consent of both parties. Children whose labor is necessary for the support of their parents are inadmissible, as well as widows and widowers whose children are dependent on them. The period of probation, called the novitiate or noviceship, must be, according to the Council of Trent, at least a year. The reformatory regulations published by Pius IX makes a novitiate of two years obligatory in almost all religious orders.

Nov'ikov, Nikolai Ivanovich, 1744–1818; Russian writer; b. Moscow; served in the imperial guard at St. Petersburg; edited the *Moscow Gazette*; founded the first circulating library in Russia; published the "Old Russian Library," a most valuable collection of historical documents, "Russian Biographies," and "History of the Jesuits."

Novi Ligure (nô'vê lê-gô'rê), town in province of Alessandria, Italy; on the N. slopes of the Apennines, at the head of a wide and fruitful plain; formerly strongly fortified, having four gates with drawbridges; contains public library, museum, academies of literature and art, valuable private picture gallery, and silk factories. It is said to have been destroyed by Attila; in 999 it is spoken of as Corte Nova, or Castrô Novo, and from that time till 1447, when it gave itself to Genoa, it maintained a semi-independence; gave its name to the battle of August 15, 1799, between the French and Russians, in which the French general, Joubert, lost his life. Pop. (1900) 13,006.

No'vum Or'ganum, name given by Francis Bacon to his great work treating of the proper mode of studying nature in order to extend the dominion of man over the inanimate world. Bacon's great aim was to recall the minds of men from what he deemed the vain and useless speculations of the ancient philosophers to the pursuit of the practical and useful. In order to present the different points of his subject in a manner at once comprehensive and striking, he has given them in the form of aphorisms. In the second aphorism of his first book he tells us that as the naked hand is often unable to perform its proper work without the aid of an instrument, so the human intellect, left to itself, is comparatively inefficient, and needs the help of instruments no less than the hand. To supply this need he composed his great work (published in 1620), comprising the ripe and rich results of a life of study. In our judgment, says Macaulay, "Bacon's greatest performance is the first book of the *Novum Organum*. All the peculiarities of his extraordinary mind are found there in the highest perfection. Many of the aphorisms, but particularly those in which he gives examples of the influence of the *idola*, show a nicety of observation that has never been surpassed."

Noyes, John Humphrey, 1811-86; American religious leader; b. Brattleboro, Vt.; studied law; later divinity at Andover and New Haven, Conn.; licensed to preach; founded, 1838, a community of Perfectionists near Putney, Vt.; removed, 1847, to Lenox, Madison Co., N. Y., where he established the Oneida community; later established another branch at Wallingford, Conn.; wrote various works sustaining his views.

N Rays. See BECQUEREL RAYS.

Nu, or Nun, Egyptian deity, representing the primeval celestial ocean on which Ra, the sun god, sails; called "the oldest of the gods"; regarded as the father of Ra and of the gods in general, being the author of creation and the source of all things. The corresponding female principle was Nu-t or Nun-t, and together they appear to have signified the male and female personification of the waters of the Nile inundations.

Nu'bia, large region in NE. Africa, forming a part of Anglo-Egyptian Sudan; bounded N. by Egypt, E. by the Red Sea, S. by the Eyp-

tian Sudan proper, and W. by the Libyan Desert and the waste S. of it; area about 350,000 sq. m.; country excessively dry, and not unhealthful; agriculture and stock raising, the main occupations of the people, are confined to the extreme S., a few oases, and to a narrow fringe along the Nile. The most arid and desolate part is the Nubian waste in the N., which would be impassable were it not for a few oases and wells. Extreme S. is watered by streams from the Abyssinian highlands. The people are a mixture of Semitic, Hamitic, and Negro elements, speaking dialects of the Nuba language, as well as Arabic, and fanatically Mohammedan in their religious faith; they number abt. 400,000. Nubia was conquered by Egypt, 1821; was mostly under Mahdist rule, 1882-08, when it was reconquered. See DON-GOLA.

Nueva Caceres (nwâ'vâ kâ'thâ-rês), formerly NAGA, capital of province of Ambos Camarines, Luzon, P. I.; on Naga River, 145 m. WNW. of Manila; head of navigation for vessels of 300 tons; well built; has fine roads, cathedral, Episcopal palace, seminary, and normal school. Pop. (1903) 10,203.

Nuevitas (nwâ-vê'tâs), town in Puerto Principe Province, Cuba; at the head of a bay on the N. coast, 60 sq. m. in area, which, however, is exposed to the fury of the trade winds, and contains dangerous reefs; town supposed to be the place where Columbus first landed on the island; is the port of Puerto Principe, capital of the province, with which it is connected by rail. Pop. (1899) 4,228.

Nuevo Leon (nwâ'vô lâ-ôn'), inland state of Mexico; bordering on Coahuila, Tamaulipas, and San Luis Potosi; area, 23,592 sq. m.; pop. (1900) 327,937; capital, Monterey; traversed by several branches of the Sierre Madre; has extensive fertile valleys, gold, silver, copper, lead, iron, sulphur, and salt; chief productions, maize, sugar cane, beans, wheat, and barley.

Nuisance (nû'sânz), anything that works hurt, inconvenience, or damage. Nuisance can best be considered with reference to the two classes of public or common nuisances and private nuisances. The former, says Blackstone, are those which affect the public, and are an annoyance to the king's subjects. Private nuisance is anything done to the hurt or annoyance of the lands, tenements, or hereditaments of another, as when one projects the eaves of his own building over the roof of that of his neighbor; or it may affect incorporeal hereditaments, as when one plows up the road in which a neighbor has a right of way across another's land. Nuisance is not committed with force, either actual or implied; and the injury it does arises rather from misuse of one's own than from abuse of another's right. Public nuisances are all those acts put forth by man which tend to create evil consequences to the community at large, and are of sufficient magnitude to require the interposition of the courts. All acts therefore which imperil the public safety or health, or disturb the public convenience, are indictable as common nuisances. Such acts are the keeping of gun-

powder in mills or magazines in a dangerous manner, near the dwellings of citizens or near a public highway, or carrying on offensive trades in populous places. All injuries to the highway which render it less commodious to the public are nuisances at common law. Cursing and swearing in public, or other disorderly conduct, is indictable as a nuisance. The remedies for nuisances vary with the character of the injury. For the private wrong there is a private remedy by civil suit, and for the public wrong a public remedy by indictment. He whose rights are prejudiced by a private nuisance may remove it by destroying, if need be, the cause of nuisance.

Nullification, in U. S. political history, the refusal of a state to permit an act of the Federal Congress to be executed within its limits. The right of each state to construe the Federal Constitution for itself was asserted in the Kentucky resolutions of 1798 and 1799, and by Virginia near the close of the administration of John Quincy Adams. In 1832 an attempt was made to give the doctrine practical effect in S. Carolina by an ordinance adopted by a convention chosen for the purpose, declaring the tariff acts of Congress null and void, forbidding the collection of duties within the state, and declaring that she would forthwith proceed to organize a separate government if the general government should resort to any acts for the enforcement of the tariff or the coercion of the state. This movement was met by a proclamation of Pres. Jackson, in which he declared that "the power to annul a law of the United States, assumed by an individual state, is incompatible with the existence of the Union, . . . and destructive of the great objects for which it was formed," and pledged himself at all events to execute the laws. Troops were sent to Charleston harbor for that purpose, but the threatening controversy was for the time allayed by the compromise of Henry Clay. The attempt of the several Southern states, 1861, to secede was founded on the assumed right of nullification, and it was not till the close of a terrible war that the question was authoritatively and finally settled.

Numantia, ancient city of Spain; capital of the Celtiberian Arevaci; on the Douro, near the present Soria, Old Castile; became celebrated on account of the heroic valor with which it defended its independence against the Romans. Of its population, 8,000 men were capable of bearing arms, and with this force it five times fought successfully (153-37). In 134, Publius Cornelius Scipio the Younger, with an army of 60,000 men, laid siege to Numantia for fifteen months. When Scipio entered the city he found no one to oppose him. Those whom plague and famine and the arrows of the besiegers had spared had fallen on their own swords. He felt that he himself had been utterly defeated, and in his fury he leveled the vacant houses with the ground.

Nu'ma Pompil'ius, in the mythical history of Rome, the successor of Romulus; reign said to have lasted 715-672 B.C.; regarded by the Romans as a sort of golden age of peace and prosperity. All the ecclesiastical institutions

which formed the basis of the religious ceremonial of the Romans were ascribed to him, and he is also said to have improved the social and political institutions of Rome.

Num'bers, Book of, the fourth book of the Pentateuch, so called because it contains an account of the second census of the Hebrews, made at Sinai in the second month of the second year of the Exodus (ch. i); it also contains (ch. xxvi) an account of a third census, thirty-eight years later. Its contents treat largely of the history of the tribes in the journey through the wilderness, and in it are also portions of the Mosaic law.

Nu'merals. See NOTATION (in mathematics).

Numid'ia, that part of the N. coast of Africa which extended between Mauritania in the W. and Africa Propria, the ancient territory of Carthage, in the E., corresponding nearly to the modern Algeria; was inhabited by the same race of people as Mauritania, the Moors, the ancestors of the modern Berbers, and divided between many different tribes. By the help of the Romans, Massinissa succeeded in uniting the tribes and establishing an empire, several of whose rulers became famous in Roman history, as, for instance, Jugurtha and Juba. In 46 B.C. Numidia was made a Roman province, and the Romans formed several colonies here, of which Hippo Regius was the most noticeable.

Numid'idæ, family of gallinaceous birds typified by the well-known guinea fowls. The general form is familiar to all, and in this respect all the species of the family agree, the body being squat, with the head small and the neck comparatively long, but not as much so as in the turkeys; the head is always more or less wattled and naked; the bill moderate; the nostrils large, oval, and partly covered by a membrane; the tarsi moderately long; the hind toe a little elevated; the tail depressed or bent downward.

Numismat'ics, science of coins and medals, and the study of history as illustrated by their images and superscriptions. A coin is a piece of metal bearing an impressed device, and designed for circulation as money. A medal is a large piece of metal struck with one or more dies, intended to commemorate some event. A medallion is now generally considered synonymous with a medal. A token is a small medal, issued by private individuals. The obverse of a coin or other piece is that side which bears the portrait or principal design. The other side is the reverse. Proofs are coins or medals struck from the original die, as distinguished from specimens struck with dies which have been reproduced by pressure from the original dies. Pattern or mint pieces are coins struck in any mint and proposed for adoption in the coinage of a country, but not adopted in the year of their first manufacture. The field on a coin or medal is the open space not occupied by a device or inscription. The exergue is variously understood as the open space outside the figure and inscriptions, or as the portion of that space below the main device, and dis-

tinctly separated from it. Strictly the exergue belongs only to the reverse of a coin, but in the U. S. this distinction is not preserved. The legend is any inscription other than the name of the monarch or personage represented

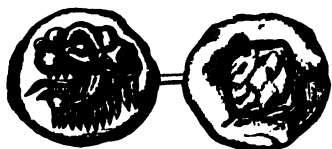


FIG. 1.—GOLD STATEROF MILETUS.

on the coin or medal. The inscription includes any legend, names, titles, etc. A mint mark on a coin is the private mark placed on it by the mint to indicate genuineness, or the place of coinage, or for some other purpose.

It has been usual to divide coins for purposes of study into three classes: (1) *Ant-*



FIG. 2.—GOLD STATEROF SARDES.

cient, from their earliest existence in the seventh century B.C. to the deposition of Romulus Augustulus (476 A.D.); (2) *Mediæval*, from this period to the beginning of the sixteenth century; (3) *Modern*, from about 1500 to the present time. The oldest coin extant is a specimen of the gold stater of the Ionian city of

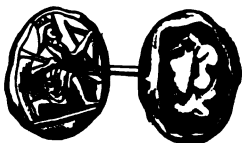


FIG. 3.—PERSIAN GOLD DARIC.

Miletus, now in the British Museum, of about 800 B.C.; but by some authorities the gold coins found in the ruins of Sardis are believed to antedate the Ionian specimen. The Persian stater or daric was also coined at a very early period. The Roman family or consular coinage and the imperial coinage form superb se-

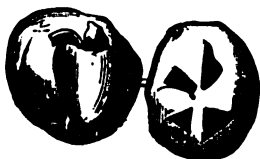


FIG. 4.—SILVER COIN OF ÆGINA. FIRST PERIOD.

ries, preserving many portraits and valuable records. Another series is that called the imperial Greek, issued by Greek cities subjected to Rome. The Roman colonial coins also form a distinct class, generally marked by the abbreviation *col.* for *colonia*.

In the E. empire the coinage became very

rude, and in mediæval times the coins of Europe and the East were little better than the earliest form of Ionian coinage. According to the best authorities, there is no certainty of the existence of any genuine Chinese coins older than 247 B.C. The earliest certain Hindu



FIG. 5.—SILVER COIN OF ÆGINA. THIRD PERIOD.

coins are of about 100 B.C. The Hebrews had no coin of their own until the time of the Maccabees, when Simon issued the shekel and the half shekel. The Arabic series begins with the successors of Mohammed in the seventh century. The issue of medals was a very early custom. The Roman series of medals or medal-



FIG. 6.—COIN OF SYRACUSE.

ions is very extensive in gold, silver, brass or copper. The French series begins with Louis XI, and is the most perfect and complete in the world. The English series begins under Henry VIII, but the medals have not high rank as works of art. The Italian and German medals of modern date are very fine; the



FIG. 7.—INSCRIBED COIN OF TARENTUM.

mediæval are bold in design, but rude in execution. One of the earliest U. S. medals is that presented to Gen. John Armstrong for his successful attack on the Indians at Kittanning, 1756.

Nun, a word of unknown origin, but supposed to be connected with Coptic word signifying "pure," applied in the Roman Catholic Church to a female who retires from the world, joins a religious sisterhood, takes upon herself the vow of chastity and the other vows required by the discipline of her convent, and consecrates herself to a life of religious devotion. Nearly all the masculine orders or rules

had corresponding feminine institutions, while there were also numerous independent orders of nuns. At present the number of nuns is largely in excess of that of monks. The first nunnery is said to have been that founded by a sister of St. Anthony, about 270 A.D.; and the first in England was founded at Folkstone by Eadbald, King of Kent, in 630.

Nun. See NU.

Nuncio (nūn'ah-l-ō). See LEGATE.

Núñez (nōn'yēth), Alvar Cabe'za de Va'ca. See VACA.

Núñez Vela (vā'la), Blasco, abt. 1490-1546; first viceroy of Peru; b. Avila, Spain; appointed, 1543, with special orders to enforce law for abolition of Indian slavery; encountered opposition of colonists; complicated revolt by imprisoning predecessor, Gov. Vaca de Castro, and killing Carbajul; deposed and arrested by the audiencia; escaped; organized an army; returned to Quito; killed by Pizarro in battle of Añaquito.

Nu'nivak, U. S. island in Bering Sea; off Cape Vancouver; separated from the mainland by Etolin Straits, about 40 m. wide; is an irregular quadrilateral, about 50 m. long by 30 broad, and contains about 1,200 sq. m.; unexplored, but known to be lightly wooded in sheltered places and to contain many high hills; inhabited by Innuits, very degraded, and noted for the beauty of their ivory carvings and of their skin canoes.

Nun of Kenmare', The. See CUSACK, MARY FRANCES.

Nureddin Mahmud (nōr-ēd-dēn' māh-mōd'), or **Malek-al-Adel** (māl'ēk-āl-ā'dēl), "just prince," 1117-74; Mohammedan ruler of Syria and Egypt; b. Damascus; succeeded his father, Zenghi, in Syria, 1145, and made Aleppo his capital; expelled the Christians from Edessa; invaded Antioch and defeated and slew Prince Raymond; and conquered all N. Syria. In 1156 he entered Damascus and made it his capital; 1159 defeated and captured Reginald de Châtillon, Prince of Antioch; afterwards conquered Egypt; received from the Caliph of Bagdad the title of sultan and the direct investiture of Syria and Egypt.

Nu'remberg (German, NÜRNBERG), city in middle Franconia, Bavaria; on both banks of the Pegnitz, here crossed by seven bridges; 95 m. NW. of Munich; is rich in mediæval monuments, which show that its ancient boast of being the commercial, industrial, and literary center of Germany was not vainglorious. Of remarkable buildings, the most striking is the Church of St. Sebald, a Gothic structure, ornamented with paintings of Albrecht Dürer, and containing the famous tomb of St. Sebald, executed in bronze by Peter Vischer, who, with his five sons, worked on it for nearly thirteen years. The townhall, the largest building of its kind in Germany, with subterranean dungeons and torture chambers; the castle, and the Church of St. Lawrence are also interesting edifices. The Albrecht Dürer Platz contains a statue of the great artist, erected 1840.

The principal manufactures of Nuremberg are carvings in wood, bone, and metals; children's toys and dolls, lead pencils, chemicals and ultramarine, looking-glasses, watches, carriages, and machinery. Nuremberg, once the wealthiest and most important of the free imperial cities of Germany, was among the earliest to accept Protestantism, and was the seat of important diets during the Reformation. It gave its name to the religious peace of 1532, which granted temporary liberty of worship to Protestants in order to secure united action against the Turkish invaders. Its fortifications, consisting of a double wall and a moat, were demolished during the occupation by the Prussians, 1866, and have been transformed into promenades. Pop. (1910) 332,651.

Nursery, in horticulture, an establishment for the rearing of plants; in the U. S., however, there is a tendency to restrict the term to those areas devoted to the growing of woody plants alone, like trees and shrubs, while the propagation of herbaceous plants is referred to floriculture. The peculiarity of nurseries in the U. S. as distinguished from those of other countries is the enormous quantity of fruit-tree plants which are propagated, a circumstance which arises from the fact that fruit-growing is the chief horticultural pursuit of the republic. The nursery interest may be divided into two categories with respect to the use and economy of the land—the growing of fruit trees and plants and the growing of ornamentals. The market value of fruit stocks is measured by their age and size combined, and it is therefore essential that they be grown on unworn land in order that the greatest possible growth may be attained in a given time. It is almost a universal practice to grow only one crop of fruit trees on the land. Nursery lands are therefore largely rented for a term of four or five years, after which farm crops are raised on the soil. Ornamental stocks are valued according to their size alone, and these can be satisfactorily grown on land already used for nursery crops.

Fruit trees are grown from seeds, and the seedlings are budded or grafted with whatever varieties of the same, or in some cases allied, species the nurseryman may desire. Ordinarily, the growing of seedlings is a separate business from the propagating and growing of named varieties. The seedlings of plums, pears, quinces, and generally of cherries, are mostly grown in France, where labor and seeds are cheap and the climate is adapted to the work. These seedlings are exported to the U. S. at the end of the first season's growth and are planted in nursery rows. The following summer (that is, the second season from the seed) these seedlings are budded to the various named varieties. These buds do not grow until the following spring, at least not in the North; so that when the bud, which is to make the body and top of the tree, begins to grow, the root is two years old. The trees are ready for sale when the bud or top is two or three years old. Apples are now mostly grown on seedlings raised in the rich soil of the Western states. These seedlings are dug and shipped in the fall of the first year. Peaches are budded in late

August or September (in the North) of the first year, and the trees are ready for sale at the close of the following year. Ornamental trees and shrubs are multiplied in a variety of ways. Some are budded or grafted, and many are increased directly by seeds, cuttings, or layers. Grapes are almost wholly grown from cuttings of the mature wood, as are also currants and gooseberries. Raspberries and blackberries are multiplied both by means of cuttings of the roots and by suckers which spring from near the base of the plant; but the blackcap raspberries are usually propagated by bending over the growing shoots or canes and allowing the tip to root in the soil, after the manner of a layer. See GREENHOUSE.

Nurse Shark, large shark (*Somniosus microcephalus*) found in Arctic or cold N. waters; of robust form; attains a length of from 12 to 20 ft., but has very small teeth and is sluggish in its motions. This name is also applied to a smaller and more slender shark (*Ginglymostoma cirrata*), occurring in the Caribbean Sea and adjacent waters.

Nut, Egyptian deity, wife of Seb (or Qeb) and mother of Osiris, Isis, Nephthys, and Set-Typhon; was the personification of the heavens; is represented as a woman standing like a quadruped on her hands and feet, while her body symbolized the heavens in which the stars appear; also represented by the figure of a cow. Nut is to be distinguished from Nu-t. See Nu.

Nut, in botany, a one-celled fruit containing, when mature, only one seed and enveloped by a pericarp of a hard, woody, or leathery texture, rarely opening spontaneously when ripe. Among the best-known and most valuable nuts are the hazel nut, Brazil nut, walnut, chestnut, cocoanut, pecan, almond, hickory nut, butternut. In France, Switzerland, and Italy chestnuts are much used as an article of food. Almonds are largely exported from S. France, and in Italy are commercially the most important nut. The manufacture of oil from nuts is a large industry, especially in France. In 1911 U. S. imported over \$14,000,000 worth of nuts.

Nuta'tion, in astronomy, a small periodic gyratory movement in the direction of the earth's axis, by which, if it existed independent of the motion in precession, the pole of the earth would describe in the heavens a minute ellipse. This ellipse would cover a space by its longer axis of 18.5" and by its shorter of 13.7", the longer axis being directed toward the pole of the ecliptic. The nutation period is a little less than nineteen years (18.6), and corresponds to that of a revolution of the moon's nodes, with which it is directly connected. The effect of the nutation on the position of the stars is combined with that from precession, and both are due to the same agency.

Nutcracker, bird of the crow family, so called from the readiness with which it cracks the nuts that form a part of its food; is nearly related to the jays; is a little over a foot in length; thick, soft plumage, dark brown, with

white or whitish spots on the head and neck; frequents the pine forests of N. Asia and Eu-



EUROPEAN NUTCRACKER.

rope, feeding on grubs, the seeds of the pine, etc.

Nut'galls. See GALLS.

Nut'hatch, any one of a number of small birds belonging to the family *Sittidae*, and, with a few exceptions, to the genus *Sitta*; have round, pointed beaks, long wings, short, rather square tails; are active climbers, and may be seen scrambling about trees, often head downward, in search of insects and their eggs. They



EUROPEAN NUTHATCH.

get their popular name from a habit of placing a seed, or small nut, in some convenient crevice, and hacking, or *hatching*, out the contents with blows of the beak. The greater number of species are found in Europe, Asia, and N. America, but a few peculiar genera, which may possibly not rightfully belong the group, are found in New Zealand, Australia, and Madagascar.

Nutmeg (*MYRISTICA*), kernel of the seed of a tree about 30 ft. in height, closely resembling the orange tree; a native of the Banda

small. German and English steamers ply on the lake, whose coasts are divided between those nations.

Nyassaland (nē-ās'ā-land), name of the region lying on the S. and W. of Lake Nyassa; organized, 1871, as the British Central African Protectorate; embraces 43,608 sq. m.; chief town, Blantyre; seat of government, Zomba; extends from the N. end of Lake Nyassa almost to the Zambesi River. Most of the natives are peaceful and industrious, and hundreds have acquired a working knowledge of the most useful trades, including printing. Cotton, tea, coffee, tobacco, wheat, rice, oats, etc., are raised; cotton, coffee, rubber, tobacco, and beeswax are among the imports. Exports and imports pass through the Chinde branch of the Zambesi Delta. There is steam navigation through Chinde, Zambesi, and Shiré rivers and Lake Nyassa to the N. end of that lake. Pop. (1908) 587 Europeans, 515 Asiatics, and abt. 947,168 natives.

Nyaya (nyā'yā) Philos'ophy, youngest of the six systems of Brahmanical philosophy, founded probably some time after the Christian era, and by a man named Gotama, or, as he is often nicknamed, Aksha-pāda, literally, "Having his eyes on his feet." The system bears the Sanskrit name *nyāya*—that is, logic—because its importance is chiefly due to its extraordinarily thorough and acute exposition of formal logic—an exposition which has held its own, even until to-day, in India, and which serves as the basis of all philosophical studies, and whose terminology has made its way into the younger treatises of all the other systems.

O, fifteenth letter and fourth vowel of the English alphabet. In English it has four sounds: long, as in *note*; short, as in *not*; obscure, as in *occur*; like oo, as in *move*, *wolf*. There are also some exceptional cases in which it takes the sound of short u, as in *love*, *come*; and of short i, as in *women*. See ABBREVIATIONS.

O', Irish prefix to proper names, meaning "son of"; same as Scottish **MAC** and English **FITZ**.

Oahu (ō-ā'hō), one of the Hawaiian islands, second in area and the most populous; Honolulu, the capital, is on this island. Pop. (1900) 58,504. See HAWAII.

Oajaca (wā-hā'kā). See OAXACA.

Oak, any one of a genus (*Quercus*) of trees of the family *Cupuliferae* ("cup bearing," because the fruit or acorn is held in a cup), related closely to the chestnuts and beeches, and somewhat distantly to the hazels, hornbeams, alders, and birches. There are about 300 species, nearly all of which grow naturally in the N. temperate zone. They are absent from Australia, Africa (except the extreme N. portion), S. America (except Colombia), and Madagas-

Nye, Edgar Wilson, 1850-96; American humorist; b. Shirley, Me.; went to Wyoming in youth; admitted to the bar; gained reputation as a humorous writer and lecturer under the pseudonym "Bill Nye"; removed to New York City; works include "Bill Nye and the Boomerang," "The Forty Liars," "Baled Hay," "Remarks."

Nyerup (nū'ēr-ōp), **Rasmus**, 1759-1829; Danish scholar; b. island of Fünen; entered the Royal Library and began his literary activity, which continued until death. His chief merit is the interest he aroused in Scandinavian folk-literature and archæology. The Museum of Northern Antiquities, in Copenhagen, is a result of his earnest efforts.

Nylghau (nīl'gā). See NILGHAU.

Nymphs, in Greek and Roman mythology, inferior female divinities, presiding over various departments of nature. The Oceanids and the Nereids were salt-water nymphs. The naiads were nymphs of fountains and other fresh waters, those presiding over lakes being also called limniads, and those over rivers potamids. The nymphs of mountains and grottoes were called oreads or orestids; of forests and groves, dryads and hamadryads; and of vales, glens, and meadows, naphææ and limoniads. They were also named from certain races or localities with which they were associated, as Nysiads, Dodonids. They were not immortal, and often perished with the objects of their care.

Nymwegen (nīm'wā-gēn). See NIMEGUEN.

car. In the U. S. there are about forty-five species, besides half a dozen or more pretty



FIG. 1.—LIVE OAK.

well-marked varieties. The white oak (*Q. alba*) is one of the most valuable trees of the

Islands and some neighboring islands; scientific name, *Myristica fragrans*. It does not flower until the eighth or ninth year, but after this time it bears flowers and fruit together



NUTMEG FLOWER AND LEAF.

constantly, and continues to do so for many years. In order to insure early fruitfulness a branch of the female tree is grafted into all the young plants when about two years old.



1. NUTMEG FRUIT. 2. SEED WITH ITS ARILLUS.
3. SEED CUT VERTICALLY.

Sometimes as much as three crops are gathered annually. Mace is the inside covering of the nutmeg. Nutmeg is used in medicine as a nerve sedative.

Nut'tall, Thomas, 1786-1859; Anglo-American botanist and ornithologist; b. Settle, England; removed to U. S. in youth; traveled in nearly every state of the Union; explored the Great Lakes and upper courses of the Missouri and Arkansas rivers; crossed to Oregon, the Sandwich Islands, and California; curator and lecturer at the botanic garden of Harvard, 1822-28; returned to England, 1841; published, among other works, "The Genera of North American Plants," "A Journal of Travels into the Arkansas Territory," "A Manual of the Ornithology of the United States and Canada," and "The North American Sylva," being

a continuation of F. A. Michaux's work on the same subject.

Nux Vom'ica, important drug consisting of the seeds or beans of a small tree of the natural order *Loganiaceæ*, growing in the coast districts of India. The leaves are roundish-oblong, stalked, smooth, and with terminal corymbs. The fruit is a globular berry, about as large as a small orange, with a brittle shell and several seeds lodged in a white, gelatinous pulp. The seeds are gray, disk-shaped, a little less than an inch in diameter, and about a sixth of an inch in thickness. They have a



NUX VOMICA TREE.

very bitter taste and are exceedingly poisonous, both these qualities depending on the presence of the alkaloids strychnine and brucine. Of these, strychnine is the more powerful and important. It is a white powder, almost wholly insoluble in water, odorless, but of an intensely bitter taste. It is highly poisonous, producing, in poisonous dose, within half an hour after taking violent tetanic spasms, the body during the paroxysms being arched backward, with every muscle convulsed and stiff. The mind is unaffected. Death occurs within an hour or two or earlier from a spasmodic prolonged spasm of the muscles of respiration, so that the patient cannot breathe. The physiological antidotes are bromides and chloral, and drugs producing motor paralysis, such as Calabar bean, hemlock, tobacco, nitrite of amyl; the anæsthetic ethers, etc., are useful in mitigating the severity of the spasms.

Nyan'za, word for lakes in E. Equatorial Africa, and especially applied to two great lakes, the *Victoria Nyanza*, or *Ukewee*, and the *Mwutan*, or *Albert Nyanza*. Nyassa is another form of the same word. See ALBERT NYANZA and NYASSA.

Nyas'sa, large lake of inner Africa; about 340 m. long and from 15 to 34 m. wide; 700 ft. deep in the S. and shallower toward its N. end; area, about 14,220 sq. m.; waters run to the Zambesi through the Shiré River. The shores for the most part are steep. Many small rivers flow into the lake on the W. coast, but the water receipts of the E. coast are

E. U. S., its tough wood being used for wagons, frames of railway cars, implements in which great strength is required, and furniture, and for interior woodwork. Burr oak (*Q. macrocarpa*), occurring E. of the Rocky Mountains,



FIG. 2.—BURR OR OVER-CUP OAK.

is notable for its large acorns and fringed cups. The chestnut oak (*Q. prinus*) occurs in the NE. parts of the U. S. Live oak (*Q. virginiana*) occurs from Virginia to Texas, and Mexico near the coast; is evergreen; attains a height of 50 to 60 ft.; wood very heavy, hard, and tough; largely used in wooden shipbuilding. California live oak (*Q. agrifolia*) is a large, spreading evergreen tree of the coast region of California. The red oak (*Q. rubra*) is a fine tree, ranging E. from the great plains. Laurel oak (*Q. imbricaria*) is a close-topped tree, with pretty foliage; range nearly same as that of the red oak. The cork oak (*Q. suber*) of the Mediterranean region is of importance for the cork which it produces. Black oak, a large tree of the U. S.; common E. of the Mississippi; now considered a variety (*tinctoria*)



FIG. 3.—EUROPEAN OAK.

1. Var. *Sessiliflora*. 2. Var. *Pendunculata*.

of the scarlet oak (*Q. coccinea*). It is a handsome tree, affording useful timber, but is best known for its thick yellow bark, used for tanning, and yields quercitron, a yellow dye. It is also called yellow oak and dyer's oak. The oak of England—"British oak"—is *Q. robur*—a fine tree, with foliage resembling that of the white oak. It grows also throughout Europe and W. Asia. Many oaks attain a great age. Trees from four hundred to five hun-

dred years old are of common occurrence in the great forests of the U. S. In Europe some



FIG. 4.—WHITE OAK TREE.

trees are supposed to be more than a thousand years old.

Oak Ap'ple. See GALLS.

Oak'land, capital of Alameda Co., Cal.; on San Francisco Bay; opposite and 7 m. E. of San Francisco. An estuary of the bay separates the city from Alameda, and steam ferries connect the cities of Oakland and San Francisco. Its location on the bay and at the W. terminus of the S. Pacific railway system gives the city a large commercial importance. It is in an agricultural and fruit-raising region, and contains many costly residences of San Francisco business men. The manufactures include products of flour and planing mills, marble and iron works, tanneries, smelting and refining works, fruit-preserving works, potteries, a cotton mill, a large jute factory, and carriage, windmill, and other factories. Here are California College (Baptist), St. Vincent's College (Roman Catholic), Pacific Theological Seminary (Congregational), California Military Academy, Snell and Field seminaries, St. Mary's College, convent, and eight libraries. The city suffered somewhat in the San Francisco earthquake of 1906, and was a place of refuge for many homeless people. Pop. (1910) 150,174.

Oak'um, coarse hemp fiber obtained by untwisting and picking out old ropes. It is used for caulking seams in ships, for stopping leaks, and for rough surgical dressings. That made from untarred rope is white oakum. The picking of old rope into oakum has long been an employment for prisoners in Great Britain and elsewhere.

Oannes (ô-ân'nēz), man-fish god of the Babylonians, resembling Dagon of the Philistines; said to have issued from the Persian Gulf, and to have founded the civilization of

lower Chaldea; represented by art, a man's head was under that of the fish, and a woman's feet were joined to its tail.

Oasis (ô'â-sis), ancient designation of fertile spots in the Libyan desert; now a general name for those in any desert. In the Sahara are upward of thirty oases, of which about twenty are inhabited. The most celebrated are the following, all in the Libyan desert: (1) Ammonium, the modern Siwah, the most remote from the Nile, contains the ruins of the Temple of Ammon, and the supposed "Fountain of the Sun." (2) Oasis Minor, the modern Bahyreh, is SE. of Siwah, and contains remains of the Ptolemaic period. (3) Oasis Trinytheos, the modern Dakhel, contains Roman monuments and artesian wells. (4) Oasis Magna, the modern Khargeh, SE. of the preceding, about 90 m. W. of the Nile, 80 by 10 m., is sometimes called the oasis of Thebes. After the Christian era it abounded in churches and monasteries. There are in the Libyan desert several other oases, among them Augila, S. of Barca, and Farafrah, between Siwah and Dakhel.

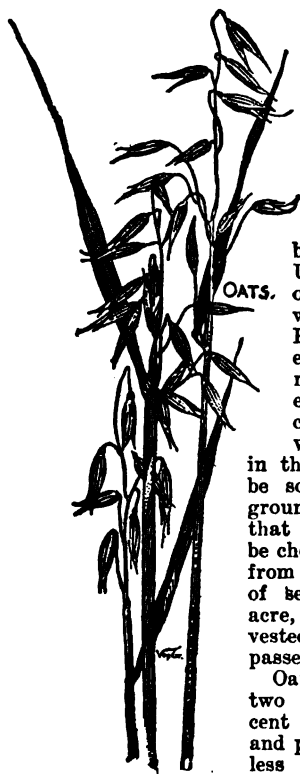
Oat, cereal grass of the genus *Avena*, and especially the cultivated *Avena sativa*, the common oat. The oat is peculiarly a N. grain, reaching its greatest perfection in cold climates, and in S. countries rapidly degenerating. The varieties are numerous, but seedsmen do not offer more than half a dozen. There are white and black varieties, and those with and without awns. A very popular variety in both England and the U. S. is the potato oat, a large, plump, white grain; the black Poland is another esteemed variety, and new ones are offered every year. Oats succeed on a great diversity of soils, and in the U. S. they need to be sown as early as the ground can be worked; that their growth may not be checked by hot weather; from two to four bushels of seed are sown to the acre, and the crop is harvested when the grain has passed the milk state.

Oats consist of twenty-two to twenty-eight per cent of husk; the larger and plumper the grain, the less refuse. Deprived of their integuments, oats are called groats or grits, and the Embden and other groats are the same crushed to various degrees of fineness. Oat meal is pre-

pared by grinding the kiln-dried grain. Oats are regarded as less nutritive than wheat, but their content of nitrogenous principles is rather larger, and of carbonaceous somewhat less than in that grain. The animated oat (*A. sterilis*) is a native of Barbary; has remarkably long, strong, and much twisted awns, bent at right angles. The two-flowered spikelets show two awns and appear wonderfully like an insect. The awns twist and untwist with the changes of moisture in the atmosphere; when the seed falls and comes in contact with the moist earth, it is enabled to travel quite a distance by the propulsion given to it by this twisting and untwisting. In 1910 the oat crop of the U. S. was 1,186,341,000 bu., valued at \$408,388,000; largest producing states, Iowa and Illinois; world's product, 4,214,727,000 bu. In 1911 the oat crop of the U. S. was 922,298,000 bu., valued at \$414,663,000, with an acreage of 37,763,000.

Oates, Titus (*alias* AMBROSE), abt. 1620-1705; English impostor; b. London; took orders in the Church of England; held parishes and a chaplaincy in the navy; was dismissed on a charge of disgraceful conduct; professed conversion to Roman Catholicism, and became a Jesuit; was expelled from the colleges of Valladolid and St. Omer for alleged misconduct. Returning to England, 1678, he laid before Charles II, and then before Parliament, forged documents alleging the existence of a "popish plot" to assassinate the king, burn London, and extirpate Protestantism in England. His accusations being believed, several Roman Catholics, including Lord Stafford, were executed, but his bad character was exposed; the Duke of York obtained a verdict of £100,000 against him for defamation; the falsity of his charges was proved, and he was imprisoned as a debtor. On the accession of James II, Oates was convicted of perjury, pilloried, publicly whipped, and imprisoned for life. After the accession of William and Mary, Parliament declared the conviction of Oates illegal. He was pardoned, and received a pension of £300 per annum.

Oath, in law, a solemn asseveration or promise under sanction of the maker's religion, in the presence of one legally authorized to administer it. If administered without authority, it has no legal effect as an oath (see PERJURY), although the transaction may subject the parties to punishment under statutes against unlawful oaths. In certain contingencies a person has authority to administer an oath to himself. In primitive and in all purer states of society solemn oaths, it would seem, have been universally taken in the name of superior beings. Among the Jews, the Greeks, and the Romans there was a distinction between their greater and their lesser oaths, and the same is probably true of other nations. The less solemn forms of adjuration included oaths by sacred objects, or by things peculiarly dear to those who employed them. In early Christian times oaths were administered in chapels and other holy places, at the altars, which were rendered more sacred by placing on them holy relics.



OATS.

called groats or grits, and the Embden and other groats are the same crushed to various degrees of fineness. Oat meal is pre-

As a witness in taking an oath must be understood to make a solemn appeal to the Supreme Being for the truth of the evidence which he is about to give, atheists could not by the common law be witnesses. Generally a disbelief in a future state goes to affect the credibility of the witness; but he will be admitted to testify under oath if he believes in the existence of a God who will punish crime, it matters not whether in this life or in another. The English statute permits those who from conscientious motives are unwilling to take an oath, to make instead their solemn affirmation, and the same indulgence is granted in the U. S. The form of administering the oath is always that which most forcibly impresses on the swearer its obligation. Jews are sworn on the Pentateuch, the closing language of the oath being, "So help you, Jehovah"; Mohammedans on the Koran; Parsees on their sacred books. A part of the ceremony of swearing a Hindu consists in his touching the foot of a Brahmin, or, if a Brahmin is sworn, in his touching another Brahmin's hand. In some parts of India the native takes his oath on water from the Ganges. Chinese oath-takers break a saucer or behead a fowl as an essential part of the ceremony. The tendency of modern legislation is to substitute declarations for oaths. See AFFIDAVIT; AFFIRMATION; PERJURY.

Oath, Ironclad. See TEST OATH.

Oaxaca, or **Oajaca** (wā-hā'kā), state of Mexico; bounded S. by the Pacific; bordering on Guerrero, Puebla, Vera Cruz, and Chiapas; E. portion included in Isthmus of Tehuantepec; area, 35,382 sq. m.; pop. (1910) 1,041,035,000; capital, Oaxaca; has many interesting antiquities, mountain forests abounding in valuable timber, extensive and rich mineral deposits; chief industries, agriculture and coffee growing. Capital is Oaxaca, in valley at foot of the Sierra Madre del Sur, 3,900 ft. above sea; founded, 1532; contains a large cathedral (1729), bishop's palace, State Institute, Seminario Tridentino, public library, and manufactures of cotton goods, cigars, chocolate, soap, and candles. Pop. (1910) 37,469.

Ob, or **O'bi**, river of W. Siberia; rises in the Altai Mountains within Chinese dominions, and flows, with a tortuous course of 2,600 m., into the Gulf of Obi, an inlet of the Arctic on the shore of Siberia. It receives many affluents, of which the principal is the Irtysh (1,500 m. long); is navigable from Tomsk to its mouth, and forms the commercial highway between China and European Russia.

Obadi'ah, fourth in order of arrangement of the minor Hebrew prophets. The book contains a single chapter of twenty-one verses, directed against Edom.

Obeid (ō-bād'), El, capital of Kordofan, Anglo-Egyptian Sudan, Africa; derives its importance from the fact that it lies in a depression of a vast semiarid plain and its wells never lack water. When the Mahdist revolt occurred (1882), the town had abt. 100,000 inhabitants. It was a great supply center for

Darfur and other parts of the Sudan, and sent large quantities of ostrich feathers and Kordofan gum to the Nile. Present pop. abt. 7,000. See DONGOLA.

Obelisk, name given to the tapering monolithic monuments erected by the Egyptians in front of their temple pylons as votive offerings to the gods and as memorials of the victorious might conferred by the deities on the Pharaohs. They are usually composed of Syenite granite. There is now near Syene, upper Egypt, a partially finished obelisk which measures 10½ ft. square at the base and 92 ft. in length, 72 ft. of it being completed. These great masses were finished on three sides before being finally



TWO SIDES OF THE NEW YORK OBELISK.



OBELISK AT KARNAK.

detached from the bed rock by the use of drills and wet edges. With the exception of a small obelisk found in the necropolis of Memphis by Lepsius, the oldest one known is that standing at Heliopolis, erected by Usertasen I, the second king of the twelfth dynasty. Cleopatra's Needles was the name given to a pair of obelisks removed from Heliopolis to Alexandria in Roman times, one of which is now on the Thames Embankment in London, and the other in Central Park, New York. They were originally erected by Thothmes III. At Luxor one obelisk is still in situ at the E. of the temple pylon; the W. and smaller one now stands in the Place de la Concorde at Paris, being 75 ft. high, and weighing 212 tons. This pair was erected by the great Rameses. Moldenke gives a list of 50 obelisks, erect and prostrate or in fragments, 20 of which are in Egypt, 2 in Constantinople, 12 in Rome, 7 in other parts of Italy, 2 in France, 5 in England, 2 in Germany, and 1 in New York. The

list, however, includes copies and uninscribed stones.

Oberammergau (ô'bér-âm'mér-gow), village of Bavaria; on the Ammer; 46 m. SW. of Munich; celebrated for the performance of a representation of the passion and death of Christ, which takes place here every ten years. The custom originated, 1634, when the population made a vow to this effect if the village escaped from further invasion of the plague, which prevailed in the vicinity, and had begun to ravage their community. The performance requires nearly 600 actors, many of whom are children, chosen among the inhabitants, who are chiefly wood carvers; is repeated on Sunday, Monday, and Friday generally, from May to September, and attracts large audiences, as it is the only place in which mysteries are still performed in true mediæval style. Pop. abt. 1,500.

O'berlin, Johann Friedrich, 1740–1826; Alsatian philanthropist; b. Strassburg; ordained to the Lutheran ministry; became, 1767, pastor of Steinthal, or the Ban de la Roche, a wild district in the Vosges Mountains. Here, under his care, deep ignorance was succeeded by general intelligence; moral darkness gave place to piety and a remarkable improvement in the industry and thrift of the district. His work was an inspiration and model for many others.

Oberlin College, coeducational, nonsectarian institution in Oberlin, Ohio; founded, 1833; has classical, philosophical, and scientific courses; preparatory, collegiate, and theological departments; separate gymnasiums for men and women, conservatory of music, herbarium, museum; chemical, botanical, and zoological laboratories, and spacious athletic field. Negro students have always been received. The college had (1910) 129 professors and instructors, 1,878 students in all departments, about 100,000 volumes in library, scientific apparatus valued at \$50,000, grounds and buildings, \$1,440,000; productive funds, \$1,698,139.

O'bi. See **OB.**

O'biter Dictum (Latin, "something said incidentally"), in law, an opinion which a judge in deciding a cause expresses on a point not necessary to the judgment. Such an opinion is not entitled to the authority of a precedent.

Oblates' (Latin, *oblatus*, "offered"), name of two congregations of priests and one of nuns in the Roman Catholic Church: (1) **OBLATES OF ST. CHARLES**, founded in Milan by St. Charles Borromeo, 1570, for home work among the neglected classes. They make an "oblation," or vow of obedience, to the bishop, the vow of poverty being voluntary. Attached to the London Oblates, but distinct in idea and institution, is "St. Joseph's Society of the Sacred Heart for Foreign Missions," intrusted by Pius IX with the spiritual care of the American freedmen. (2) **OBLATES OF MARY IMMACULATE**, a society of regular clerks, founded at Aix, France, 1815, by Charles J. E. de Mazenod, afterwards Bishop of Marseilles. They take charge of ecclesiastical seminaries, penitentiaries, charitable es-

tablishments, and foreign missions. Since 1841 they have occupied posts in the extreme N. and W. of British America; and have many establishments in the U. S. (3) **OBLATE SISTERS OF PROVIDENCE**, a sisterhood of colored women, founded at Baltimore, 1825, by the Rev. H. Joubert, for the general needs of the colored population.

Obligation (in law). See **BOND**; **CONTRACT**.

Obligation Days, in the Roman Catholic Church, days on which the faithful abstain from customary work as far as possible and hear mass; they are Circumcision, Epiphany, Ascension Day, Corpus Christi, SS. Peter and Paul, Assumption, All Saints, Christmas—all in England and Wales; in addition, St. Andrew in Scotland, and St. Patrick and Annunciation in Ireland.

Oboe (ô'boi), or **Hautboy** (hō'boi), musical wind instrument of an elongated conical form and with a high, piercing tone, ranging from C below the treble clef to G, the fourth line above the staff. Apparently it was at first used solely by military bands, but from the time of Bach it has been one of the most important wind instruments in the orchestra. Custom has led the A of this instrument to be considered the standard pitch.

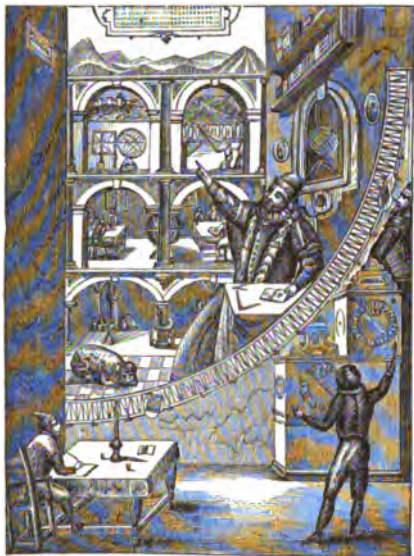
O'Bri'en, Fitz James, 1828–62; Irish author; b. Limerick; is believed to have been for a time a soldier; squandered a large inheritance in London; removed to the U. S., 1852; contributed to newspapers and periodicals; acquired reputation by "The Diamond Lens" and other stories in the manner of Poe; wrote plays, including "A Gentleman from Ireland"; was a leader among the "Bohemians" of that period; entered the Union army, 1861, and was killed in a skirmish near Cumberland, Md. A collection of his stories and poems appeared 1881.

Ob'sequies. See **FUNERAL**.

Observant'ine Fri'ars and Nuns, monastic order of the Roman Catholic Church. The primitive rule of St. Francis having been modified by various popes, there arose within the order a new party desirous of returning to the austere rule of former days. Certain followers of the severe rule, 1368, were organized as a separate congregation, called Brethren of the Stricter Observance, or Observantines; these are far more numerous and influential than the Conventuals, or followers of the mitigated rule. The Capuchins and other congregations follow a still severer rule, and are called Brethren of the Strictest Observance.

Observatory, place for making observations on any great class of natural phenomena. Observatories are of three kinds: magnetical, for observing the phenomena of terrestrial magnetism; meteorological, for observing the phenomena of atmospheric changes; and astronomical, for observations of the heavenly bodies. In an astronomical observatory it is necessary that there should be a fixed support for the instruments, and exemption from tremors and atmospheric disturbances. Of the instruments,

the first in importance are the transit instrument and the equatorial telescope. The former has two distinct uses: one to determine the time or regulate the astronomical clock and fix its rate, because nearly every astronomical observation requires a somewhat accurate statement of the moment at which it was made; the other to determine the right ascensions of the heavenly bodies. Other instruments, such as the prime vertical transit, vertical circle, and alt-azimuth, are of less uni-



TYCHO'S OBSERVATORY.

versal application. The discovery and introduction of the spectroscope and consequent investigations on the constitution, temperature, and other peculiarities of the heavenly bodies, which were before impossible, have added to the outfit of most observatories. The application of photography to astronomy has resulted in the same way.

The first celebrated observatory in astronomical history is that of Tycho Brahe, founded 1576, on the island of Hveen, N. of Copenhagen. This no longer exists. The observatory of Paris, built 1667-71 by order of Louis XIV, is the oldest of existing astronomical institutions. The Royal Observatory at Greenwich, England, began operations 1676. The Emperor Nicholas built, 1838-40, an observatory at Pulkowa, 10 m. S. of St. Petersburg, on a scale of unprecedented magnificence. The University Observatory of Königsberg, Germany, founded early in the nineteenth century, is renowned for the work of Bessel. There is also a National Observatory at Berlin. The most noted national establishment of the kind is the Astrophysical Observatory at Potsdam. Of the university observatories, that of Bonn is especially noteworthy. The Strassburg Observatory was founded abt. 1873. The observatory of Nice, at Mont Gros, some 1,200 ft. high, is noted for the discovery of small planets by photography and the study of physical aspects of Venus

and Mars. The universities of Edinburgh, Cambridge, Oxford, and Dublin have also noteworthy establishments of the sort. Among Irish observatories, that of Lord Rosse, at Birr Castle, Parsonstown, was long celebrated for the largest telescope ever built.

The first telescope used in the U. S. for astronomical purposes was set up, 1830, at Yale College. The first observatory building was erected, 1836, at Williams College, Massachusetts, by Prof. Hopkins. The West Point Observatory, under Prof. Bartlett, and the Naval Observatory at Washington, under Capt. Gilliss, soon followed. In 1873 the latter was supplied with a refractor (by Alvan Clark) having an object glass 26 in. in aperture, which at the time was the largest of the kind in existence. Four years later it acquired new celebrity by Prof. Hall's discovery of the satellites of Mars. More recently a new and magnificent establishment has been erected on an elevation N. of the Georgetown section, which in its buildings and outfit fairly rivals any in the world. It has acquired celebrity through the application of photography to the registration of transits and zenith distances. The Cincinnati Observatory, established abt. 1843 by Prof. Ormsby M. Mitchel, was the first of the larger observatories built in the U. S. The Dudley Observatory at Albany has acquired importance by the work of Prof. Boss, its director, in cataloguing a zone of stars. The Harvard Observatory, which dates from 1843, with auxiliary stations at Arequipa, Peru, and Mandeville, Jamaica, has grown to be one of the greatest in existence. The principal work has been the photometry of the heavens, the photographing of the constellations, and the study of the spectra of the fixed stars.

The Lick Observatory in California is remarkable for possessing, under the founder's provision, a telescope "more powerful than any yet made." (See LICK, JAMES.) The discovery of the fifth satellite of Jupiter, made there by Barnard, 1892, is of interest. The observatories of Ann Arbor and Hamilton College are noted for the discovery of minor planets made by their former directors, Watson and Peters. The Madison Observatory has done excellent work with its meridian circle and equatorial telescope. Princeton, the Univ. of Virginia, and several other institutions are also supplied with fine establishments. The Yerkes Observatory of the Univ. of Chicago, at Lake Geneva, Wis., has a telescope with an object glass of 40 in. diameter. The observatory of Prof. Percival Lowell at Flagstaff, Ariz., has come into prominence on account of the photographs of the canals of Mars there obtained and the claim of the astronomer that these are the work of intelligent beings. The principal object of a magnetic observatory is to record the changes continually going on in the earth's magnetism. The most noted in America is that of Toronto, Canada, where continuous observations have been kept up for a considerable period. The Greenwich Observatory has also a magnetic department. A meteorological observatory, as its name implies, is devoted especially to records pertaining to the weather, the readings of the barometer, thermometer, etc.

In a well-fitted modern meteorological observatory the conditions of the wind and weather are automatically recorded on sheets, so as to preserve a permanent record, available for study and comparison at any future time.

Obsidian and Pumice, two modifications of feldspathic or trachytic lava, obsidian being glassy, while pumice is a porous, fibrous, or tumented mass. The different conditions to which the lava is subjected are the cause of the difference in the two minerals; obsidian is produced by the action of heat principally, while pumice is the result of various external agencies, chiefly aqueous vapor and a certain temperature while the lava is fluid. Obsidian was used by the ancients for mirrors and ornaments. The ancient Mexicans used it for cutting instruments. Pumice is employed as a polishing material; is chiefly obtained at Campo Bianco, one of the Lipari Islands.

O'cam, or Ock'ham, William of, d. 1347; English scholastic philosopher; b. Occam; became a Franciscan; pupil in Paris of Duns Scotts; rejected the realism of his master, and became the most eminent of Nominalists; was known as the "Invincible Doctor." He strenuously opposed the pretensions of the popes to political power and secular possessions, and by John XXII was summoned to trial before an ecclesiastical court at Avignon, whence he took refuge, 1328, with Louis of Bavaria, then in the midst of a struggle with that pope. He never signed the recantation demanded of him. His chief works are "Tractatus Logices," "Quodlibeta Septem," "Super Quatnor Libros Sententiarum," "Expositio Aurea Super Totum Artem Veterum."

O'com, or Occum, Samson, 1732-92; American Indian preacher; b. near Norwich, Conn.; belonged to the Mohegan tribe; educated in Wheelock's Indian School at Lebanon; removed to Montauk, L. I., N. Y., abt. 1748, where he taught and preached; visited England, 1766; attracted large audiences, and obtained valuable gifts for the Wheelock school; wrote an account of the Montauk Indians, and the hymn, "Awaked by Sinai's Awful Sound."

Occulta'tion, in astronomy, the hiding of one heavenly body behind another. The most common cases of this phenomenon are the occultation of stars by the moon, several of which can usually be seen every month with the aid of a small telescope. Two important astronomical conclusions have been drawn from such occultations. One is that the apparent diameters of even the brightest stars do not exceed a small fraction of a second. Another conclusion is that the moon has no atmosphere, or at least none dense enough to exert any refraction upon the rays of light. Did such an atmosphere exist, the star, when near occultation, would be seen through it, and its light would suffer a certain amount of refraction. Observations of occultations are useful both for the determination of longitudes and for fixing the position of the moon. See ECLIPSE; TRANSIT.

Occupat'ion, in Roman law, the act of taking possession. The possession thus acquired, if the law allowed, could end in full ownership.

The principal objects which could by Roman law be thus taken possession of were (1) wild animals, which in their free state were held to be without an owner; (2) things abandoned by an owner with the intention of giving up his ownership and without intending to transfer his right to another; (3) treasure trove in certain cases only; (4) things taken from a public enemy during war, however, went first to the state, which could give rights over them to others, as to the captors. Discovery, exploration, and settlement resulting in beneficial use, found a valid claim to territory hitherto unoccupied. The history of the U. S. claim to Oregon and of the formation and colonization of the Kongo Free State may be read in illustration. In the "Instructions for the Government of Armies of the United States in the Field," issued in 1863, it is declared that "a place, district, or country occupied by an enemy stands in consequence of the occupation under the martial law of the invading or occupying army." "Martial law is the immediate and direct effect and consequence of occupation or conquest," whether a proclamation to that effect has been made or not. In 1874 at Brussels was held a conference of delegates of European powers to work over a code of the rules to be observed in civilized warfare. Their project, as modified by discussion, speaks as follows of military authority within the territory of an enemy: "A territory is considered to be occupied when it is found in point of fact placed under the authority of a hostile army. Occupation extends only to the territory where such authority is established and is in a position to be exercised."

"The legal authority being suspended and passing into the hands of the occupant, he will take all possible steps to reestablish and secure order and public business."

"With this in view he will maintain the laws in force in time of peace unchanged, except in case of necessity."

This code has never received governmental sanction; it simply represents the opinion of the delegates.

O'cean, body of salt water which surrounds the continents and covers more than three fifths of the surface of the globe. It is sometimes spoken of as the hydrosphere, between the solid geosphere and the gaseous atmosphere. Its area is 150,000,000 sq. m.; average depth, about 2 m. (according to Krummel, open oceans, 2,000 fathoms; all salt water, 1,800 fathoms); volume, 300,000,000 cubic m., or $\frac{1}{13}$ of the earth's volume; mass, 13×10.17 tons, or $\frac{1}{13}$ of the earth's mass. By the configuration of the lands, which rise above its surface, it is partially separated into divisions, known as the Atlantic, Pacific, Indian, Arctic, and Antarctic oceans. All these bodies of water are united in one great system, and are kept of nearly uniform composition, notwithstanding numerous local causes of change. The great surface currents are caused by the winds; the deep movement from the polar seas is due chiefly to difference of density resulting from difference of temperature; the opposed surface and bottom currents in certain straits are caused by difference of density; active al-

ternating currents in estuaries and sounds are caused by the tides. The greatest depths thus far discovered are in the Pacific, about 70 m. SE. of Guam, made by U. S. cable surveying steamer *Nero*, 1899, 5,269 fathoms, and in the Atlantic, N. of Porto Rico, 4,561 fathoms. The great oceanic depression sinks much deeper beneath the sea level than the mean height of the land rises above it.

A principal characteristic of the water of the ocean is its saltiness. This is owing chiefly to chloride of sodium, or common salt. There are several sulphates, carbonates, iodides, and bromides, all the saline matter forming about one thirtieth of the weight of the water which holds it in solution. In minute proportions are found gold, silver, lead, iron, copper, aluminum, etc. The saltiness of the surface waters varies by small but significant amounts. The average density is 1.026, but it rises to 1.027 in the dry trade-wind belts of the open ocean, where evaporation is in excess of rainfall, and to over 1.028 in inclosed seas, like the Mediterranean and the Red seas. The density of the ocean at the bottom is hardly greater than at the top, so little is water compressible, in spite of vast pressures exerted on it. Although the water on the open ocean is remarkably transparent, it is believed that sunlight is practically extinguished at a depth of a few hundred fathoms. The greater part of the deep ocean floor is smooth and monotonous, without the variety of relief that characterizes the lands. Excepting within a few hundred miles of the shore, it receives no significant share of mechanical land waste. Barring volcano cones, and occasional inequalities near continents, not characteristic of the open oceans, the ocean floor is a gently undulating plain of limy or clayey mud or "ooze." The ooze is derived for the most part from the disintegration of the skeletons of minute forms of life (chiefly *Foraminifera* which live near the ocean surface), with a small share of volcanic dust. The broad and gentle undulations of the bottom by which the shallower "swells" descend to the deeper "abysses" do not serve to break its monotony.

Life is extremely abundant and varied in the waters along the shores of the torrid zone, and exists in remarkable variety even in much colder latitudes, both the vegetable and animal forms of the polar seas being much more numerous than those of Arctic lands. Other forms inhabit the open sea near the surface, hence called pelagic forms; and others again which inhabit the bottom of the deepest oceans, in spite of the intense pressure of the overlying water, of the monotony of the surrounding physical conditions, and of the absence of sunlight.

In 100 parts of ocean water, 3.5 parts are dissolved salts, whose composition as determined by Dittmar for the *Challenger Report* is:

Chloride of sodium.....	77.758
Chloride of magnesium.....	10.878
Sulphate of magnesium.....	4.737
Sulphate of calcium.....	3.600
Sulphate of potassium.....	2.465
Bromide of magnesium.....	0.217
Carbonate of calcium.....	0.345

Besides these substances, many others exist in minute proportions, as bromine, iodine, fluorine, phosphorus, silicon, boron, gold, silver, lead, copper, zinc, cobalt, nickel, iron, manganese, aluminum, barium, strontium, etc. See DEEP SEA TIDES; EXPLORATION.

Ocean Grove, town in Monmouth Co., N. J.; on the Atlantic; 1 m. from Asbury Park, 6 m. S. of Long Branch; popular summer resort; widely known as the seat of the Ocean Grove Camp Meeting Association of the Methodist Episcopal Church; organized, 1869. Pop. abt. 2,700.

Ocea'nia, or Ocean'ica, term formerly used by geographical writers to denote lands in greater or less areas of the Pacific, some including only Polynesia, Melanesia, and Micronesia, and others adding Australasia and the E. Indian Archipelago. Many geographers and mapmakers do not now employ the term.

O'celot (*Felis pardalis*), one of the hand-somest of the cat family found in America. It is found from SE. Texas to Patagonia, and formerly ranged to Louisiana. The color va-



COMMON OCELOT.

ries from tawny yellow to reddish gray, marked with numerous black spots, and dark stripes and blotches edged with black; length varies 3 to 4 ft.; tail 11 to 15 in. long.

Ocher (ô'ker), any one of certain pigments made of clays colored by hydrated peroxide of iron in variable proportions, varying in shade from pale yellow to deep orange. In mineralogy, earth varieties of hematite or iron peroxide, if bright tinted, are known as red ocher, while clayey and decomposing limonites, or hydrated peroxides, give rise to brown ocher; term also used in that science to express the earthy, powdery, decomposing oxides of other elements.

Ocmul'gee Riv'er, stream rising in central Georgia by several head streams, flows in a generally SSE. course, and above Colquitt joins the Oconee to form the Altamaha; length, 300 m.

O'Con'nell, Daniel, 1775-1847; Irish patriot; b. Cahirciveen, Kerry; of an ancient family;

called to the bar, 1798; soon became prominent in the work of the emancipation of Roman Catholics and of Ireland. In 1823 he founded the Catholic Association, which exerted a powerful influence in favor of the repeal of legislation unfavorable to Ireland, but the government brought in a bill to suppress it, and it dissolved itself, 1825. In 1828 he was chosen to Parliament, but was excluded by the test oath; 1829, however, the Roman Catholic emancipation took place, and O'Connell entered the House of Commons. His life work was one of agitation for the repeal of the Union. In 1843 he was arrested on a charge of conspiracy and sedition, convicted, and heavily fined; but the Lords reversed the judgment, partly, falling under the control of more impetuous spirits, began to discredit the moral-force policy of O'Connell. In 1845 his influence was fast declining, and, 1846, his support of the Whig ministry tended to make him even more unpopular. In 1847 he started on a pilgrimage to Rome, but died at Genoa.

O'Con'nor, Roderick (popularly called **ROBY**), 1116-98; last independent king of Ireland; b. Connaught; succeeded to the throne of Connaught, 1156; disputed the supremacy for several years with the O'Neals and the O'Briens; assumed the title of King of Ireland, 1166; assembled a parliament of lords and clergy at Athboy, 1167; aided in the expulsion of Dermot, King of Leinster, 1168; defeated the English invaders under Strongbow, but subsequently came to terms with them and reinstated Dermot in his kingdom; afterwards carried on war with England until 1175; acknowledged Henry II as lord paramount of Ireland, retaining for himself his ancestral kingdom.

O'Connor, Thomas Power, 1848- ; Irish journalist; b. Athlone; entered Parliament, 1880; became prominent leader of the Parnellite party and of the Land League; lectured in the U. S., 1881; elected president of the Irish National League of Great Britain, 1883; elected to the Commons for the Scotland division of Liverpool, 1885; author of "Lord Beaconsfield," "The Parnell Movement," and other works; editor of the *Cabinet of Irish Literature*, and of the *Star*, *Sun*, *T. P.'s Weekly*, and other newspapers.

O'Con'or, Charles, 1804-84; American lawyer; b. New York City; admitted to the bar, 1824; attained the highest rank in his profession; was U. S. district attorney for New York City under Pres. Pierce; member of New York State constitutional conventions, 1846 and 1864; senior counsel for Jefferson Davis when indicted for treason. He was nominated for the presidency by the Labor Reform convention in Philadelphia, and by the so-called Straightout Democrats in Louisville, Ky., 1872; declined both nominations, but received 29,489 votes; prominent in prosecuting the "Tweed ring" cases, 1873.

Octahedron, solid bounded by eight triangular planes. If regular, its faces are equilateral. It has twelve edges and six solid angles, each formed by four equal plane angles.

Its solid contents are equal to the cube of one of its edges multiplied by .4714045.

Octa'via, abt. 64-11 B.C.; sister to Augustus, Emperor of Rome; was first married to C. Marcellus, and after his death to Mark Antony; was a woman of remarkable beauty and great accomplishments and for conspicuous nobility of character. Her son, M. Marcellus, was adopted by Augustus, and it was expected that he would be his successor, but he died prematurely, 23 B.C. In 32 B.C. Octavia was divorced by Antony, but she continued to devote herself to his children, and even educated his children by Cleopatra; died heartbroken.

Octo'ber (from Latin, OCTOBER, originally the eighth month of the Roman year), tenth month in the Julian and Gregorian years.

Octop'oda, suborder of *Cephalopods*, or cuttlefishes, in which but eight arms (feet) are developed around the mouth; the body is sac-like, and no true shell is developed. About fifteen genera and 100 species are known. *Octopus*, the principal genus, contains several large species, one of which, weighing in large specimens 60 lb., occurs in the Mediterranean, while an Alaskan species has a "radial spread of nearly 28 ft." The genus *Argonauta* contains the "paper nautilus" or "paper sailor," in which the female secretes a calcareous egg case, which is the "shell" so familiar in cabinets. The stories about this form floating about on the surface of the ocean and raising its arms as sails to catch the breeze are now known to have no foundation in fact.

Oct'opus. See CEPHALOPODA.

Odd Fel'ows, Independ'ent Order of, secret benevolent and benefit association which had its origin in London, England, abt. 1745. The earliest lodges of Odd Fellows were mainly for social purposes. In 1809 a member of a London lodge introduced the order into Manchester, where it was so favorably received that, in 1814, the lodges in Manchester and vicinity were consolidated as The Independent Order of Odd Fellows of the Manchester Univ. This body has organized lodges in the United Kingdom, France, Turkey, Africa, N. and S. America, E. and W. Indies, and Australasia. Societies of Odd Fellows were organized in the U. S. as early as 1806, but had a brief existence. In 1819, Thomas Wilkey and four other members of Odd Fellows' lodges in England, organized "Washington Lodge No. 1" in Baltimore, Md. In 1821, Washington Lodge surrendered its English charter to a "body of past grands," and "the Grand Lodge of Maryland and the United States" was organized, the members of Washington Lodge receiving a subordinate charter from the new grand lodge. In 1878 the name of the supreme body was changed to The Grand Lodge of the Independent Order of Odd Fellows, and in 1879 the present title, The Sovereign Grand Lodge of the Independent Order of Odd Fellows, was adopted. The motto, "Friendship, Love, and Truth," was known and used in connection with the order, 1775. Official reports for 1909 showed a membership in subordinate

lodges under the jurisdiction of the Sovereign Grand Lodge of 1,396,319; members of Rebekah lodges, in addition, 371,687 sisters, 199,513 brothers; relief paid in a year, \$44,808,592, of which \$1,006,253 was for the burial of the dead.

In 1851 the degree of Rebekah, primarily for women connected with subordinate lodges by male membership, was established, and, 1882, a degree for uniformed members of the encampment branch, later known as the degree of Patriarch Militant. There is no affiliation between the Manchester Unity and the Sovereign Grand Lodge.

Ode, in modern use, a lyric piece of more dignified character than the song, and usually one in which profound feelings are expressed. The ancients originally included under this name all kinds of lyric verse. Pindar, Alceus, Anacreon, Sappho, Simonides, and others among the Greeks, and Horace, Catullus, and others among the Romans, were writers of odes.

O'dense, town of Denmark; capital of Fünen; is an old and prosperous city, with good educational institutions and an active trade; has a castle and a Gothic cathedral built 1086-1301, and several large sugar refineries and iron foundries. Pop. (1906) 40,547.

Odenwald (ô'dên-wâlt), mountain region of Germany, in Hesse-Darmstadt, extending about 45 m. from the Neckar, which to the S. separates it from the Black Forest, to the Main, which to the N. separates it from the Spessart Mountains; highest peaks about 2,000 ft.; mountains covered with pine, oak, and beech, and valleys with orchards and vineyards.

O'der, river of Germany; rises in Moravia; enters Prussian Silesia, where it becomes navigable at Ratibor, traverses the provinces of Brandenburg and Pomerania, and, after a course of 550 m., empties through the Stettiner Haff into the Baltic; along its lower course embankments are required against inundation.

Odes'sa, fortified town and seaport of Russia; in government of Kherson; on a bay of the Black Sea; in population and commerce surpassed only by St. Petersburg, Moscow, and Warsaw, and most important port on the Black Sea; communicating by regular steamship lines with the chief ports of Europe; founded, 1794, by Catherine II. It has a spacious modern double harbor, capable of accommodating 350 vessels, largely artificial, and protected by long moles. The city is well built and has broad, straight streets. In the environs are villas and orchards, beyond which stretches a barren steppe. It has many benevolent institutions, and is a great educational center; has a university (formerly Richelieu Lyceum) with rich museum, observatory, and library. There are numerous breweries and manufactories of cordage, sailcloth, soap, and candles, but Odes'sa is specially important as the S. outlet for grain, which constitutes the greater part of the entire exports. In 1905 the city was the scene of terrible rioting, in which 3,500 persons, largely Jews, were killed, 15,000 wounded, and property worth many millions was de-

stroyed. The crew of the battleship *Kniaz Potemkine*, flagship of the Baltic Sea fleet, mutinied at sea, put into the harbor here, declared war against the government, and further excited the terrorists. A strong military force restored order, and twenty-four ringleaders were hanged, but there were several revolutionary outbreaks later. Pop. (1900) 449,673.

Od'ic Force, term originally applied to a peculiar iridescence which some people could see about the arms of a magnet; later the name for a mysterious force supposed to be transmitted from a hypnotist; has received the synonym psychic force from Crookes, who performed several startling experiments with Home, the spiritualist; Sergeant Cox, and others, which he asserted were due to its action.

O'din, in Scandinavian mythology, the father of gods and men; styled Alfather; has a great number of names, one of which is Valfather—that is, "the father of the slain," since those who fall in battle go to his great hall, called Valhal—that is, "the hall of the slain." War is called Odin's amusement. The sword is called Odin's fire. He is described as a tall, long-bearded, one-eyed old man. In the dawn of time he pawned one eye for a drink of Mimir's fountain of wisdom beneath Ygdrasil. On his eight-footed horse Sleipner he rides through the air and on the waters, clad in his blue cloak and golden helmet, and wielding his spear Gungner. Two ravens, Hugin (thought) and Munin (memory), sit on his shoulders and tell him all that they see and hear. At dawn he sends them out to gather news, and they return to him in the evening. His servant is Hermod, the swift messenger. Odin is found in all Teutonic countries, and by the name Vata can be traced back to India. The Anglo-Saxons and Old High Germans called him Wodan.

Odoacer (ô-dô-â'sér), d. 493 A.D.; King of Italy. After the abdication of Nepos and the elevation to the imperial throne of Romulus, the barbarian mercenaries demanded for their services a third part of the lands of Italy. When this was refused, the soldiers chose Odoacer, chief of the Heruli in the imperial service, for their leader, who compelled Romulus to abdicate (476). Odoacer made Ravenna his capital, and though styled King of Italy, never assumed the purple. He ruled the country mildly, enforced the laws, and protected the frontiers from the barbarians of Gaul and Germany. At length Theodoric, leader of the Ostrogoths, defeated him near Aquileia and at Verona, and defeated another army on the Adda. Odoacer retired to Ravenna, and after three years capitulated on condition of ruling with equal authority with Theodoric; but in a few days he was killed by the order of his associate.

Odom'eter, instrument for determining the distances passed over in traveling; also known as pedometer, perambulator, etc. Odometers attached to the wheels of carriages record the number of revolutions of a wheel in passing from one place to another, and are known as

cyclometers. The odometer carried by pedestrians, and designed for recording the number of steps, is generally called a pedometer. It resembles a watch in size and shape, and may be worn in the vest pocket. By the rising and sinking of the body with each step a lever is made to vibrate, which moves the index hand.

O'Don'nell, Leopold (Duke of Tetuan, Count of Lucena), 1809-67; Spanish soldier; b. Santa Cruz, Tenerife; for his services against the Carlists at Lucena, 1839, was made a grandee and lieutenant general; 1840, sided with the queen mother and went to France, where he intrigued against his former ally, Espartero; 1843, after the latter's fall, was made Captain General of Cuba, where he became moderately wealthy; 1854, became Espartero's War Minister; succeeded him as Prime Minister, 1856, and was several times a member of the cabinet. In 1859-60 he commanded in Morocco; captured Tetuan, February 6, 1860; retired, 1866.

O'Donojú (ō-dōn-ō-hō'), **Juan**, 1755-1821; last Spanish viceroy of New Spain (Mexico); attained the rank of lieutenant general in the army, and had held high civil positions in the Peninsula when, 1821, he was appointed Captain General and Acting Viceroy of New Spain. On his arrival at Vera Cruz he found that the revolution, led by Iturbide, had acquired such strength that his own authority was practically nullified. On August 23d he met Iturbide at Cordoba and signed a treaty by which Mexico was recognized as an independent empire, and it was agreed to invite one of the Spanish Bourbon princes to reign over it. Pending advices from Spain, O'Donojú was elected one of the provisional regents. He died in Mexico before he could learn of the nullification of his treaty by the Spanish Cortes.

Odysseus (o-dīs'ūs), or **Ulys'ses**, King of Ithaca, son of Laertes and Anticlea, daughter of Autolycus; won as his wife Penelope, daughter of Icarius of Sparta, in return for suggesting to Tyndareus the oath taken by the suitors of Helen. When his son Telemachus was a babe, Odysseus was prevailed on by a ruse of Palamedes and Nestor to join the expedition against Troy, whither he sailed with twelve ships. At Troy he was distinguished for bravery, pertinacity, eloquence, and cunning. He therefore took part in expeditions that required a spy's cool and skillful work. The arms of Achilles were awarded to him after that hero's death, a fact which drove Ajax mad. At the close of the Trojan War he was driven by the ill-will of Poseidon to various parts of the world. The story of his return is told by Homer in the "Odyssey." Finally, after ten years' wanderings and twenty years' absence from home, he reached Ithaca in safety, and with the help of his son Telemachus and a few faithful servants slew the suitors of Penelope.

Oedenburg, or **Ödenburg**, town of Hungary; near Lake Neusiedl; 37 m. SE. of Vienna; prosperous and handsomely built town, with a large trade in wheat, wine, and cattle, and

manufactures of sugar and soap. Its old fortifications have been demolished, with the exception of a huge watch tower, the highest in Hungary; remains of the Roman time are also found. Pop. (1900) 33,478.

Œd'ipus, in Greek mythology, a son of Laius, King of Thebes, and Jocasta, who was exposed by his father on account of an ill-boding oracle, but was saved by a shepherd and brought to Corinth. Misunderstanding another oracle, he left Corinth and went to Thebes. On the way he slew his father unaware, and at Thebes married his mother. She bore him two sons, Eteocles and Polyneices, and two daughters, Antigone and Ismene; but the hidden horrors of his life were subsequently revealed to him. Jocasta hanged herself; between Eteocles and Polyneices there was a deadly hatred, and they slew each other; Œdipus put out his own eyes and wandered blind, guided by Antigone, from Thebes to Colonus in Attica, where he died in the grove of the Eumenides. The legends of Œdipus, of which the two baneful oracles and his meeting with the Sphinx, whose enigma he unriddled, form the mystical but singularly suggestive center, were often treated by the Attic tragedians, and there still exist two tragedies on this subject by Sophocles, "King Œdipus" and "Œdipus at Colonus."

Oehlenschläger, or **Öhlenschläger** (ō'lén-shlä-gér), **Adam Gottlob**, 1779-1850; Danish poet; b. Copenhagen. His early efforts procured him a traveling stipend from the government. In Germany he mastered the German language, into which he translated his works. After visiting Rome, he returned to Denmark, 1810, and became Prof. of Æsthetics at Copenhagen. His fame chiefly rests on his tragedies; works include "The Death of Balder," "The Gods of the North," "Aladdin," "Stærkodder," "Hakem-Jarl," "Palnatøke," "Axel and Valborg," "The Admiral Fordens Kjøld," etc.

Œnop'ides, Grecian astronomer and philosopher of Chios; supposed to have been a contemporary of Anaxagoras; is named among the Greeks who visited Egypt and became acquainted with the learning of the Egyptians; said to have claimed the discovery of the obliquity of the ecliptic; invented a cycle for bringing into agreement the solar and lunar year, which he inscribed on a brazen tablet and set up at Olympia; proposed also a theory of the rise and fall of the Nile, and an explanation of the Milky Way as the original pathway of the sun.

Oersted (ōr'stéd), **Anders Sandøe**, 1778-1860; Danish jurist; b. Rudkjøbing; became Attorney-general, 1825; member of cabinet, 1841-48; Prime Minister, 1853-54. His chief fame rests on his services to Danish jurisprudence, which in its present condition may be regarded as the result of his labors. He was a man of remarkable industry, learning, and clear insight, and all these he brought to bear on a thorough revision of the system of jurisprudence. Among his most important works is a manual of Danish and Norwegian jurisprudence.

Oersted, Hans Christian, 1777-1851; Danish physicist; brother of the preceding; made important discoveries with respect to the action of acids during the production of galvanic electricity; became Prof. of Physics in the Univ. of Copenhagen, 1806; published "Manual of Mechanical Physics," describing his experiments on the compressibility of water and air, 1809; a work tending to show the identity of magnetism and electricity, 1812, and promulgated his discovery of this identity, 1820; founded the magnetic observatory of Copenhagen, and the Danish Society for the Diffusion of Natural Science.

Oesel, or Ôsel (ô'sêl), island in the Baltic, in government of Livonia, Russia; area, 1,000 sq. m.; wheat, rye, oats, and barley are raised; cattle, sheep, and horses are reared, and considerable fishing is carried on; was governed by the Teutonic Knights for a long period; passed into the possession of Denmark, 1559; ceded to Sweden, 1645, and to Russia, 1721. Pop. abt. 42,000.

Ofanto (ô-fân'tô), river of S. Italy, called by the ancients Aufidus; rises 6 m. E. of Monte Marano; enters the Adriatic 4 m. NW. of Barletta, after a course of 75 m.; battle of Cannæ was fought on its right bank near its mouth.

Offa, d. 796; King of Mercia; reigned in the latter half of the eighth century; greatly extended the boundaries of his kingdom; famous as the builder of Offa's dike, for several centuries the boundary between England and Wales. He established an undisputed suzerainty over the heptarchy; murdered Ethelbert, King of E. Anglia, and took possession of his kingdom, 792; founded the abbey of St. Albans; drew up a code of laws.

Offenbach (ôf'en-bâk), Jacques, 1819-80; German composer; b. Cologne, of Jewish parentage; played the violoncello in the orchestra of the Théâtre Comique, Paris; became, 1847, leader of the orchestra of the Théâtre Français; established, 1855, the Bouffes-Parisiens; and composed a great number of burlesque operas and scenes, of which "La Fille de Madame Angot," "Barbe Bleue," "Orphée aux Enfers," "La Belle Hélène," and "La Grande Duchesse" were the most applauded.

Offset, in surveying, a short distance measured at right angles to a straight line in order to locate the position of a point. The method of determining the position of an irregular line by means of offsets is to run a straight course in the general direction of the line, and at suitable points of this course to measure offsets to the line in question; then, knowing the distance of each offset from the origin of the course, the length of each offset, and its direction, whether to the right or left, the corresponding points of the irregular line may be plotted. The method of offsets is particularly valuable in filling in the outlines of a topographical survey, and especially in tracing the courses of roads, streams, and coast lines.

Og, King of Bashan, one of the two kings of the Amorites who resisted the invasion of the Israelites under Moses. He was overthrown

at Edrei, and his kingdom was given to the half tribe of Manasseh. He was a giant, his iron bedstead, which was kept in Rabbath-Ammon, being 9 cubits long and 4 broad.

Og'den, capital of Weber Co., Utah; at confluence of Ogden and Weber rivers; mouth of Ogden cañon, and foothills of the Wasatch Mountains; 37 m. N. of Salt Lake City; derives excellent power for manufacturing from the rivers; is in an agricultural, fruit-growing, iron, salt, lime, building-stone, and coal region. There are the State Industrial School, state schools for the blind and deaf and dumb, Weber Stake Academy (Mormon), Ogden Academy (Congregational), military academy, and manufactures of powder, woolen goods, lumber-mill products, flour, shoes, brooms, and foundry products. Pop. (1910) 25,580.

Og'densburg, city in St. Lawrence Co., N. Y.; at confluence of St. Lawrence and Oswegatchie rivers; 175 m. NW. of Albany; founded 1749, incorporated 1868; popular name, "Maple City"; is well built; obtains power for manufacturing from the rivers; has large river trade, steam ferry to Prescott, Canada, and steamer communication with Chicago and intermediate lake ports; contains U. S. Govt. Building, Roman Catholic Cathedral, Refuge for the Aged, orphanage, convent, hospital, several public parks, and large grain elevators and warehouses. Pop. (1910) 15,933.

O'gelthorpe, James Edward, 1688-1785; founder of the colony of Georgia; b. London; was an officer of the Queen's Guards; served as aid-de-camp to Prince Eugene; member of Parliament, 1722-54; projected a plan for a colony in N. America to serve as an asylum for oppressed Protestants of Germany and other continental states, and for other persons. In 1732 twenty-one "trustees for founding the colony of Georgia" were incorporated, and, 1733, a party of colonists, under the guidance of O'gelthorpe, who was appointed governor of the colony, arrived at Charleston. He returned to England, 1743; made general of all his Majesty's forces, 1765.

Ogilby, John, 1600-76; Scottish poet; was a dancing master in London, master of the revels in Dublin; later studied at Cambridge and settled in London; published metrical translations, including one of Homer, and a descriptive "Geography of the World" of which "America" is curious and valuable.

Ogowe (ô-gô-wâ'), one of the largest rivers of W. Africa; rises between 2° and 3° S. lat., near 14° E. lon., and after a general NW. course for about 300 m. turns SW. near the equator, then W., and enters the Atlantic through many streams, forming a large delta extending nearly 50 m. along the coast a little S. of the equator. Many attempts to explore the Ogowe were defeated by the natives, but Savorgnan de Brazza (beginning 1876) revealed its entire course. A large part is navigable in high water by light-draught vessels; many European trading posts are on its banks; the native population is numerous, and the river is the most important natural factor in the work of developing the French Kongo territory.

Ogyges, in Greek mythology, the first king of Thebes, whose oldest gate was called, after him, the Ogygian. During his time the waters of Lake Copais rose above its banks and inundated the whole valley of Boeotia. An Ogygian deluge is also spoken of in Attica, and Ogyges himself is sometimes represented as a Boeotian autochthon, sometimes as an Egyptian king, and was brought into manifold connections with the earliest legendary history of Greece.

O'Higgins, Bernardo, 1776-1842; Chilean statesman; b. Chillan, Chile; son of Ambrosio O'Higgins; educated in England; returned and became a military leader in revolution, 1810; succeeded Carrera in command of army, 1813; joined him to fight Spanish army sent from Peru; defeated at Rancagua, 1814; joined San Martin in invasion of Chile; gained victory at Chacabuco, 1817; occupied Santiago; made supreme dictator. He governed for nearly six years, during which the last Spaniards were driven from Chile, and the country was rapidly developed; his steady support of San Martin did much to secure the overthrow of the Spaniards in Peru. The opposition of the aristocratic party and of the old adherents of Carrera at length led to a revolution, and O'Higgins was forced to resign, January 28, 1823.

Ohio, popular name, BUCKEYE STATE; state flower, golden-rod; state in the N. central division of the American union; bounded N. by Michigan and Lake Erie, E. by Pennsylvania and W. Virginia, S. by W. Virginia and Kentucky, W. by Indiana; boundary between W. Virginia and Kentucky, the Ohio; greatest length E. to W., 215 m.; greatest breadth N. to S., about 210 m.; area, 41,010 sq. m.; pop. (1910 census) 4,767,121; principal cities and towns: Cleveland, Cincinnati, Toledo, Columbus (capital), Dayton, Youngstown, Akron, Springfield, Canton, Hamilton, Zanesville, Lima, Sandusky, Newark, Portsmouth, Mansfield, Findlay, E. Liverpool, Lorain, Steubenville, Marietta, Chillicothe, Ashtabula, Piqua, Massillon, Ironton, Marion, Tiffin.

Surface an undulating plain, 450 to 1,550 ft. above sea; highest point near Bellefontaine, Logan Co.; highest extended portions in the central part; watershed separating the St. Lawrence system from the Mississippi valley system runs from NE. to SW. across the state, attaining an average height of from 1,100 to 1,300 ft. This dividing range enters the state in Ashtabula Co., but a few miles from Lake Erie, and crosses irregularly to the central W. border, passing thence SW. into Indiana. The N. side is smaller and the rivers are shorter, though the descent from the high central tableland is more gentle than in the S. slope. There are a few small lakes in some of the W. counties. Rivers in the N. or St. Lawrence system emptying into Lake Erie, the Maumee, Sandusky, Huron, Vermilion, Black, Rocky, Cuyahoga, Chagrin, Grand, Ashtabula, and Conneaut; in S. system as tributaries of the Ohio, the Mahoning, Walhonding, and Tuscarawas, which unite to form the Muskingum, the Scioto, Little Miami, and Great Miami. Of these only the Maumee is navigable, and that for only

about 20 m. from Lake Erie. There are four canals, built, owned, and operated by the state: Ohio (from Lake Erie at Cleveland to the Ohio at Portsmouth), including feeders, 334 m.; Miami and Erie (from the Ohio at Cincinnati to Lake Erie at Toledo), including branches, 282 m.; Hocking (branch of the Ohio canal), 56 m.; Walhonding, 25 m. Summers extremely warm in the S.; heat rarely very intense in the central section; in the N. materially tempered by the presence of the large body of water on the boundary; winters seldom rigor-



ous in any part, but occasionally severe in the N., where snowfalls are often heavy; mean annual temperature in January, 26°; July, 72.9°; mean annual precipitation in May, 4.60; December, 2.48.

Soils in the SE. formed directly from the underlying and outcropping rocks; in the rest of the state, derived from the clay and gravel of the drift, a mixture of the various formations lying in the path of the glacial ice; limestone soils in the W. part and the clay of the uplands excellently adapted to agriculture; the raising of cereals, truck and fruit farming, dairying, and the raising of sheep for wool, the leading industries. Production of principal crops, 1911: Corn, 150,540,000 bu.; wheat, 36,240,000 bu.; oats, 54,570,000 bu.; barley, rye, potatoes, and hay; tobacco, 81,400,000 lb.; value of live stock (1911), \$217,234,000. The wool clip (1911) yielded 9,425,000 lb. of scoured wool, valued at \$4,429,750. Mineral products include petroleum, natural gas, iron ore, bituminous coal, sandstone, limestone, fire clay, Portland cement, glass sand, grindstones, oilstones, salt, gypsum; value products (1910), \$188,075,258, including clay products, \$31,525,948; coal, \$35,932,288; pig iron, \$88,122,356. Leading manufacturing industries, iron and steel, foundry and machine-shop products, malt and distilled liquors, agricultural implements, slaughtering and meat packing, flouring and grist-mill products, boots and shoes, carriages and wagons, clothing, printing and publishing, tobacco, furniture, electrical apparatus and supplies, leather, glass, brick and tile, food preparations, lumber, paints, paper, saddlery and harness. "Factory-system" plants (1909), 15,136; capital employed, \$1,300,733,000; value products, \$1,437,938,000. Customs districts and ports of delivery, Cuyahoga,

Miami, and Sandusky; value imports, year ending June 30, 1911, \$6,500,350; exports, \$14,970,918. Principal educational institutions comprise thirty-three of collegiate rank, including Ohio State Univ., Columbus; Oberlin College (nonsectarian), Oberlin; Kenyon College (Protestant Episcopal), Gambier; Marietta College (nonsectarian), Marietta; Ohio Wesleyan Univ., Delaware; W. Reserve Univ. (nonsectarian), Cleveland; Univ. of Cincinnati (nonsectarian), Cincinnati; Buchtel College (Universalist), Akron; Denison Univ. (Baptist), Granville; Univ. of Wooster (Presbyterian), Wooster.

Territory embraced within Ohio discovered and explorations begun by the French under La Salle abt. 1670; charter of James I and Charles II granted jurisdiction over the region to Virginia and Connecticut; attempts by the English to establish trading posts and to plan for settlement, abt. 1748-49, caused disputes with the French, resulting in war; English possession established by the Treaty of Paris, 1763. During the Revolutionary War disputes arose between the states as to the ownership of the W. lands. Massachusetts, Connecticut, New York, and Virginia laid claim to the NW. region, while the other states regarded the land as the joint possession of the thirteen. Maryland's refusal to accede to the Articles of Confederation unless the individual states gave up their claims brought about a cession to Congress of the title to the lands in question, save that Connecticut reserved a tract (popularly known as the W. Reserve) along Lake Erie, W. of Pennsylvania, containing 3,666,291 acres, and Virginia reserved a similar tract, to pay her land bounties, between the Miami, Scioto, and Ohio rivers, containing 3,709,848 acres. Provisions made by Congress for the survey and sale of W. lands, 1785; the famous ordinance for the government of the territory NW. of the Ohio, forbidding slavery in the entire region, passed 1787. Chief events of 1788, the first settlement, made at Marietta by a colony from Massachusetts, another settlement at Cincinnati, and the formal organization of the territorial government; Indian raids ended by the victory won, 1794, by Gen. Anthony Wayne, on the Maumee; first territorial legislature met at Cincinnati, 1799; Ohio admitted to the Union, February 19, 1803; Chillicothe the state capital, 1800-10 and 1812-16; Zanesville, 1810-12, and Columbus after 1816. During the War of 1812 the state suffered from British and Indian raids, and during the Civil War was twice invaded by Confederate troops.

Ohio River, largest affluent of the Mississippi in respect to its discharge of water, which averages 158,000 cu. ft. per second, that of the Missouri being but 120,000 ft. The Ohio originates at Pittsburg, Pa., in the confluence of the Allegheny and Monongahela. Its length below Pittsburg is 975 m.; total length, 1,265 m. A straight line from Pittsburg to Cairo, Ill., at its mouth, measures 615 m.; drainage area, 202,400 sq. m., according to Ellet, or 214,000, according to Humphreys; elevation at Cairo, 322 ft.; at Pittsburg, 1,021; mean fall, .72 of a foot to the m.; mean rate

of flow about 3 m. an hour; mean rise in flood some 30 ft. above extreme low water.

Ohio State University, coeducational, non-sectarian institution in Columbus; opened 1873; offers courses in philosophy, science, agriculture, horticulture and forestry, civil, mining, mechanical, and electrical engineering, pharmacy, veterinary medicine, law, industrial arts, and manual training; had (1910) 214 professors and instructors, 2,749 students in all departments, and about 96,000 volumes in library.

Öh'lenschläger, Adám Gottlob. See OEHLENSCHLÄGER.

Ohm (öm), Georg Simon, 1787-1874; German physicist; b. Erlangen, Bavaria; appointed Prof. in Physics at Jesuit College of Cologne, 1817; director of the Polytechnic School in Nuremberg, 1833, and professor at Munich, 1849; discovered Ohm's law (see ELECTRICITY); was rewarded with the Copley medal by the Royal Society of London.

Ohm, unit of resistance in electricity, adopted by the International Electrical Congress in Paris, 1884; is the resistance, at a temperature of 0° C., of a column of pure mercury, 106 cm. in length and 1 sq. mm. in cross-section.

Oil Cake, residue after the expression of fixed oils from crushed or ground seed of any kind; used both as food for animals and as a direct fertilizer; cake is frequently pulverized before using, and is then called oil meal.

Oil City, city in Venango Co., Pa.; at junction of the Allegheny River and Oil Creek; 8 m. ENE. of Franklin; in the center of the great petroleum-oil district, and in its early days was wholly dependent on that industry; contains several large refineries, pipe works, iron foundries, engine and boiler works, and other manufactories. Pop. (1910) 15,657.

Oil cloth, a covering for floors manufactured with a burlap foundation, upon which successive coatings of coarse paint are applied. On the face is a colored pattern printed with blocks. These blocks are made of wood, and are usually about 18 in. square. There is one block for each color applied; less than seven colors are generally used. Floor oilcloths are made in many qualities and of various widths, ranging from 3 ft. to 24 ft. in width. Very much the larger business is done in the medium weight narrow widths. A floor cloth with the coined name "linoleum," consisting of a mixture of oxidized linseed oil and finely ground cork pressed upon a backing of coarse burlap, is now very largely used. It is the invention of an Englishman, William Walton. Several large mills are manufacturing it in the U. S., the patents having expired, and its extended use has seriously curtailed the production of the heavier grades of floor oilcloth.

Oil Rivers, branches of the Niger; form its delta, though some of them have sources independent of that river. From them comes most of the palm oil exported from W. Africa. They form a wonderful network of more or less

navigable rivers and creeks extending from the E. boundary of Lagos to the N. frontier of the German Kameruns.

Oils and Fats, important natural group of organic compounds found in the various parts of plants, particularly the seeds, and in animals, principally in the adipose tissues. In vegetables there are two kinds of oil, totally distinct and having a different chemical formation, *viz.*, the fixed, which are analogous to the animal oils and fats, and the volatile or essential oils; and there is also a class of oils and fats which are the result of destructive distillation. The natural oils and fats are now regarded as the compound ethers of glycerin, a triatomic alcohol, and may be artificially formed by the action of this alcohol on certain monobasic acids. The principal elements in their composition are carbon and hydrogen, oxygen entering as a constituent in smaller proportions; the solidity of the fatty body being generally in proportion to the amount of carbon, and its fluidity in proportion to that of oxygen. When separated from the organism the fatty bodies which are solid at ordinary temperatures are called fats, while those which are liquid are called oils. We owe our fundamental knowledge of the fatty bodies to the investigations of Chevreul, made abt. 1820. He regarded them as compounds of stearine, oleine, and margarine; but Heintz has shown that his margarine is not a simple fat, but a mixture of palmitine and stearine. The natural oils and fats may be heated to nearly 500° F. without much change; but they cannot be distilled without decomposition, by which they are distinguished from the volatile oils, the latter evaporating and distilling at various temperatures. See titles of various oils.

Oise (wāz), river of France; rises in the Ardennes, Belgium; joins the Seine after a course of 158 m.

Ojib'ways, tribe of N. American Indians; belonging to the Algonquin family; often called **CHIPPEWAS**; formerly ranged along both sides of Lakes Huron and Superior in the U. S. and Canada; became known to the French, 1640; numbered 2,000 when Fathers Jogues and Raymbault began a mission among them at Sault Ste. Marie, 1642; were under British influence during the Revolutionary War and the War of 1812; several times made peace with the U. S. Govt.; numbered, 1905, in British America, 15,000; in Michigan, 3,000; elsewhere in U. S., 14,144.

O'ka, river of central Russia; chief affluent of the Volga; rises in government of Orel; becomes navigable at Orel, and joins the Volga at Nizhni-Novgorod, after a course of 837 m.; is of great importance as a commercial highway.

Okecho'bee, Lake, largest lake in the S. U. S., in Florida; 40 m. long; area, 1,250 sq. m.; maximum depth, 12 ft.; receives several streams, of which Kissimmee River is the most important; waters are discharged through the Everglades mainly by the Caloosa River.

Okefeno'kee Swamp, one of the largest swamps of the U. S.; covers an area of about

500,000 acres, in Charlton, Ware, and Clinch cos., Ga., and Baker Co., Fla.; 40 m. N. and S. by 30 E. and W.; E. part mostly an open lake dotted with small floating islands; lake portion 12 m. in width; swamp has forests of heavy timber, and is the abode of rattlesnakes, moccasins, and alligators, besides many species of game birds.

O'ken, Lorenz (real name **OCKENFUSS**), 1779-1851; German naturalist; b. Bohlsbach, Baden; had already published several important works, containing the main features of his system, when, 1807, he became Extraordinary Prof. of Medical Sciences at Jena. His celebrated inaugural discourse on the vertebral composition of the skull was delivered in the presence of Goethe, who had invited him thither. In 1816 he began the publication of the *Isis*, a periodical devoted principally to natural science. His political criticisms led to his retiring from Jena, and after being for a time professor at Munich was appointed, 1832, Prof. of Natural History at Zürich, which post he retained till his death; works include "Handbook of Natural Philosophy," "General Natural History."

Okhotsk (ô-chôtsk'), Sea of, large inlet of the Pacific on the E. shore of Asia, between Saghalin, Siberia, Kamchatka, and the Kuril islands. Its N. part is frozen from November to April.

Oklaho'ma (Indian word, meaning "Beautiful Land"), state in the S. central division of the American union comprising the former Territory of Oklahoma and Indian Territory; bounded N. by Kansas and Colorado, E. by Missouri and Arkansas, S. by Texas, W. by Texas and New Mexico; N. boundary, the parallel of 37° N. lat.; area, 70,067 sq. m.; pop. (1910) 1,657,155, including (1910) 117,247 Indians; principal towns, Oklahoma City (capital), Muskogee, Guthrie, Shawnee, Enid, Ardmore, McAlester, Chickasha, Tulsa. Greater part of the surface an upland prairie, rising gradually toward the N. and W.; principal elevations, the Wichita Mountains in the S. and the Chautauqua Mountains in the central part; principal streams, Cimarron and Canadian rivers, tributaries of the Arkansas, with general course from NW. to SE.; Red River, forming the S. boundary line with Texas; N. and Salt Forks of the Red, and Salt Fork of the Arkansas. The climate is so equable that the staple products of both N. and S. states can be cultivated with profit; average annual temperature, 58.40°; mean annual rainfall about 35 in.; production of principal farm crops (1911): Corn, 36,888,000 bu.; wheat, 8,976,000 bu.; oats, 8,181,000 bu.; barley, rye, potatoes, and hay; cotton crop (1910) yielded 955,951 bales upland cotton, valued at \$64,860,000, and 410,000 tons of seed, valued at \$10,090,000; stock raising in W. part an important industry. Chief minerals: Coal, copper, silver, clays, gypsum, granite, sandstone, limestone, petroleum, natural gas, salt; value products (1910), \$32,988,865. Leading manufactures: Flour, grist, cotton-seed oil and cake; "factory-system" plants (1909), 2,310; capital employed, \$38,873,000; value products, \$53,682,000.

Chief educational institutions: Univ. of

Oklahoma, Norman; normal schools, Edmond, Alva, Weatherford; Agricultural and Mechanical College, Stillwater; Epworth Univ. (Methodist Episcopal), Oklahoma City; Langston Univ. for Colored, Langston; Chilocco Industrial School for Indians.

Oklahoma constituted the W. part of Indian Territory provisionally ceded by the Creeks and Seminoles, 1866; civilized Indians and negro freedmen were allowed to settle, but no whites. The lands (5,439,865 acres) were completely ceded, and the unoccupied portion was thrown



open to settlement, April 22, 1889, on which day a U. S. court was established, more than 50,000 persons entered as settlers, and a bank was opened at Guthrie. Oklahoma Territory was created May 2, 1890, and was made to include the lands ceded by the Creeks and Seminoles, together with the Public Land Strip, or No-Man's Land (Beaver Co.). The Cherokee Strip was to be added to the territory whenever the Indian title should be extinguished, without further legislation. Further cessions were made by the Sac and Fox, Pottawatomie, Shawnee, Cheyenne, and Arapahoe Indians, and as a result nearly 300,000 acres of land were opened to white settlers, 1891. The Cherokee Strip, of some 6,000,000 acres, was thrown open, 1893, and the "Big Pasture," some 505,000 acres in SW. Oklahoma, on the Red River, belonging to the Comanche, Kiowa, and Apache Indians, 1906. An enabling act, admitting Oklahoma and Indian Territory as one state, was approved, June 16, 1906, and a constitutional convention met at Guthrie, November 6th. Oklahoma entered the Union with a law prohibiting the manufacture and sale of intoxicants.

Oklahoma City, largest city and, since 1911, capital of Oklahoma State; on the N. Canadian River. The river has a fall of 27 ft. in 4 m., and the power thus obtained has been brought into the city for manufacturing purposes. The city is the largest cotton market in Oklahoma; contains flour mills, cotton gins, brickyards, packing houses; has a large trade in agricultural products and lumber; is

seat of Epworth Univ. (Methodist Episcopal). Pop. (1910) 64,205.

O'kra. See GUMBO.

Okubo (ók'ô-bô), Toshimichi, 1830-78; Japanese statesman; b. province of Satsuma; early directed his energies to the overthrow of the Tokugawa shogunate; 1870-78, was the most powerful minister in the imperial cabinet; went on a special mission to China, 1874; settled the Formosan difficulty; later, Saigo Takamori separated from him and raised a revolt in Satsuma; but the suppression of this rebellion, 1877, left Okubo's policy triumphant; member Iwakura embassy to Washington, 1872; assassinated.

Okuma (ók'ô-mâ), Shigenobu, 1837-91; Japanese financier; province of Kiushiu; after the restoration entered the Foreign Office, and became a councilor of state, 1870, with charge of the finance department. For the next twelve years he directed the finances of Japan, but the depreciation of the fiat currency and other circumstances led to his removal. In 1882 was organized the Kaishinto, or Constitutional Liberal party, of which he was the acknowledged leader. He founded a college in Tokyo—the Semmon-Gakko—largely devoted to the study of political economy.

O'laf, Saint, d. 1030; King of Norway; in his career as a viking, visited Sweden; infested the shores of France and Spain, and during the absence of Eric (1014) in England made himself master of the Kingdom of Norway. He marched through his dominions at the head of an army, compelling submission to Christianity. Canute the Great laid claim to Norway, and conquered the kingdom. Olaf fled with his infant son Magnus to Russia; but two years afterwards (1030) entered Norway from the N., gave battle to the Danes near Drontheim, and was killed.

Olaf Trygvason, 964-1000; King of Norway; great-grandson of Harald Haarfager, and son of Trygve, viceroy in SE. Norway; plundered in England with the Danes, but made peace with King Ethelred, 994, and accepted the Christian faith; returned to Norway, 995, and, the ruler, Hakon Jarl, having been driven from the throne and murdered, obtained the throne, and strove to introduce Christianity. An alliance was formed against him by the kings of Denmark and Sweden and the banished Norwegian, Jarl Erik Hakonson, and, in a fierce naval engagement near the island of Svolder in the Baltic, Olaf fell.

Ol'bers, Heinrich Wilhelm Mathias, 1758-1840; German astronomer; b. near Bremen; practiced as a physician; gave his leisure hours to the study of astronomy, especially comets; invented a new method of calculating the orbits of comets from three observations, which proved easier and more accurate than the old one; and his calculations and observations of comets, published 1782-1829 and 1833, had a great reputation. Of the planets between Mars and Jupiter, which were eagerly sought after by the astronomers in the beginning of the nineteenth century, he discovered two—Pallas, March 28, 1802, and Vesta, March 29, 1807.

Oldcastle, Sir John (Baron Cobham), d. 1417; English reformer, b. in reign of Edward III; for propagating the doctrines of Wycliffe was confined in the Tower and condemned to the flames, but escaped into Wales; after four years was discovered; falsely accused of raising an army of 20,000 Lollards to overthrow the king; carried to London; hanged in chains on a gibbet, and roasted to death. He wrote "Twelve Conclusions Addressed to the Parliament of England," besides several religious tracts and discourses.

Old Catholics, name assumed, 1870, by members of the Roman Catholic Church who denied the ecumenical character of the Vatican Council and rejected its decrees, especially that concerning the infallibility of the pope, as contrary to the ancient Catholic faith. Soon after the proclamation of the doctrine of infallibility, forty-four professors of the Univ. of Munich, including Dr. Döllinger, joined in a protest against papal infallibility and the binding authority of the Vatican Council. Many of the Catholic professors at other universities and gymnasia followed this example. Prominent theologians and professors of the canon law met in August at Nuremberg, and agreed on a joint protest. The breach between the Old Catholics and the heads of the church widened, and the excommunication of Döllinger (April 17, 1871) led to the formation of Old Catholic societies in nearly all the cities. A general Old Catholic Congress met at Munich, September 22d, composed of about 300 delegates, representing all parts of Europe, and a profession of faith was adopted. At the second congress, held in Cologne, 1872, a plan for definitive organization of the Old Catholic Church as an independent body was adopted, and the work was completed by the election of a bishop, June 4, 1873, at Cologne. Dr. Joseph H. Reinkens, Prof. of Theology in the Univ. of Breslau, was consecrated at Rotterdam by Bishop Heykamp of Deventer, of the Old Catholic (Jansenist) Church of Holland. The third congress, held at Constance, September 12th and 13th, adopted a synodal constitution of the church, which resembles that of the Protestant Episcopal Church in the U. S.

A union conference of Old Catholic, Eastern, and Anglican theologians met under the presidency of Dr. Döllinger at Bonn, September 14-16, 1874. The adoption of several theses on doctrinal questions indicated that the difference between Old Catholics and the Roman Catholic Church was no longer limited to papal infallibility. Among other points, the theses object to the full canonicity of the apocryphal books of the Old Testament; to divine service in a language not understood by the people; to the doctrine of the transferability of the superabundant merits of the saints; to the doctrine of the immaculate conception of the Virgin, and to indulgences not restricted to penances really imposed by the Church herself. Outside of Germany, the Old Catholic movement gained a firm footing only in Switzerland.

Old Colony, name often applied to SE. part of Massachusetts.

Old Coun'try, term applied to the British Isles by natives residing elsewhere.

Old Domin'ion, term applied to Virginia; derived from its official designation in colonial days—"Colony and Dominion of Virginia."

Oldenburg (öl'den-börkh), grand duchy of N. Germany; consists of Oldenburg proper, bordering N. on the German Ocean and surrounded on the other sides by Hanover; the principality of Lubeck, wholly inclosed by Holstein, the Baltic, and territory of the free city of Lubeck; and the principality of Birkenfeld, in Rhenish Prussia; area, 2,482 sq. m.; pop. (1905) 438,856. Oldenburg was established as an independent state, ruled by a count, at the end of the eleventh century. The family that established its power then has ruled ever since, giving, moreover, new dynasties to Russia, Denmark, and Sweden.

Oldenburg, capital of grand duchy of Oldenburg; has several educational institutions, museums, and scientific collections; public library, fine ducal palace with beautiful gardens, two large and much frequented cattle and horse fairs, and an active trade on the Hunte River. Pop. (1900) 28,635.

Oldham, town in Lancashire, England; on the Medlock, 6 m. from Manchester; noted especially for its great cotton mills; other manufactures: silks, velvets, hats, cords, and weaving machines. Pop. (1901) 137,246.

Oldha'mia, peculiar organism having a branching, plantlike form, thought by some to be a polyzoon, by others a vegetable; found in the Cambrian rocks of Ireland, and interesting as one of the first known forms of life.

Old Hick'ory, nickname originally applied to Andrew Jackson by his soldiers, 1813.

Old Home Week, period set apart either by states or by particular cities and towns for the revisitation of their birthplace by former residents. It was instituted in New Hampshire by Frank W. Rollins when governor of that state (1899-1901), and has become popular in many parts of the U. S. In most of the states it is celebrated in summer. Public exercises are always held, but the social side of the celebration is the one most strongly emphasized.

Old Ironsides, popular name of the U. S. frigate *Constitution*, of historic fame.

Old La'dy of Thread'needle Street, nickname of the Bank of England, on Threadneedle Street, London.

Old Light. See **NEW LIGHT**.

Old Man of the Moun'tain, appellation given to Profile Mountain, Franconia range, New Hampshire, from its resemblance to a man's face.

Old Point Com'fort, seaside resort in Virginia; 11 m. N. of Norfolk, on Chesapeake Bay, and at the mouth of the James River. The climate is cool in summer and warm in winter. Fort Monroe here commands the entrance to Hampton Roads.

Old Probabilities, term applied in the U. S. to the forecaster of the Weather Bureau; originally to Gen. Albert J. Myer, who organized the service.

Old Red Sand'stone, geologic formation of Devonian age occurring in Scotland and Wales. The name was formerly applied also to one of the units of geologic chronology, but in that sense has been replaced by Devonian. The formation in Scotland has an estimated thickness of 6,000 to 20,000 ft., including shales, conglomerates, and volcanic tuffs, as well as the characteristic red sandstones.

Old Style. See CALENDAR.

Olean'der, evergreen shrub (*Nerium olean-der*) of the dogbane family, a native of warm



DOUBLE OLEANDER.

parts of the Old World, and now extensively cultivated; in colder regions thrives as an ornamental shrub, but requires protection from



OLEANDER.

frost. Its flowers are usually of a rich pale red, but are sometimes white.

Oleas'ter, small tree (*Elæagnus angustifolia*) of the family *Elæagnaceæ*, a native of warm regions in the Old World; is planted as an ornamental tree for its silvery foliage; flowers exceedingly fragrant.

Ole Bull (ôlê bôl). See BULL, OLE BORNE-MANN.

O'lefines, hydrocarbons, so called from their property of forming oily compounds with chlorine, like Dutch liquid; are found among the products of destructive distillation, and may be formed by the exposure of paraffins to high temperatures under pressure.

O'leic Ac'id, organic, monatomic acid (formula $C_{18}H_{34}O_2$), found in combination with glycerin in oils and fats, as oleine, or oleate of glycerin. It is obtained by the saponification of oleine, the most fluid constituent of the natural fats and fixed oils. Olive or almond oil is treated with potash, which sets free the glycerin, oleate of potash being formed in the soapy mixture. This soap is treated with tartaric acid, which combining with the potash forms tartrate of potash. The separated fatty acid is heated for some hours in a water bath with oxide of lead, and the oleate of lead is dissolved in ether, from which solution oleic acid is liberated by the action of hydrochloric acid.

O'lein, or **Ela'in**, that portion of oil or fat which remains liquid at ordinary temperatures; the oily principle of solid fats; is of variable composition, but in all cases it consists of oleic acid, or of some acid homologous with the oleic, combined in various definite proportions with glycerin. The olein of commerce is chiefly a crude oleic acid prepared from palm oil in the British candle factories. Lard oil is a similar product derived from lard in the U. S. Both are now chiefly used for oiling machinery.

Oleomar'garine. See BUTTER.

Oler'iculture. See HORTICULTURE.

Oléron (ô-lâ-rôh'), island of France, in Bay of Biscay; separated from the mainland by a strait 1 m. wide in its narrowest part, opposite the mouth of the Charente; length, 18 m.; greatest breadth, 7 m.; has five ports, besides the towns of Château and St. Pierre d'Oléron; successively belonged to the counts of Anjou, the dukes of Aquitaine, the English, and the French. Pop. (1901) 17,033.

Ol'ga, d. 969; Russian princess and saint of the Greek Church; was the wife of Igor, Grand Duke of Kiev, son of Rurik, and after his death, 945, was regent till 955 for her son Sviatoslav. The latter remained a pagan, while she was baptized at Constantinople, 957. Day, July 11th (23).

Oliaros (ô-lî'â-rôs). See ANTIPAROS.

Olib'anum, gum resin which exudes from the tree *Boswellia serrata*, which grows in Africa and India; melts with difficulty and imperfectly when heated, and burns with a bright flame; has a balsamic, resinous smell and an acrid bitter taste; is used for fumigation and

in the preparation of plasters; has been burned from antiquity in religious ceremonies. See **FRANKINCENSE**.

Ol'igarchy, form of government in which the supreme power is vested in a small class of persons. It differs from aristocracy in the extent of the governing class, which in an aristocracy usually embraces the entire body of the nobles, while in an oligarchy a certain political clique or coterie has the controlling influence. See **ARISTOCRACY**; **DEMOCRACY**; **MONARCHY**.

Ol'igocene Pe'riod, division of geologic time succeeding the Eocene period and preceding the Neocene. In the classification of Cenozoic or Tertiary time by Lyell three divisions were recognized: Eocene (older), Miocene, and Pliocene. Subsequently it was found advantageous in classifying certain European formations to substitute two divisions for the Eocene, the name Eocene being retained for the older, and Oligocene, proposed by Beyrich, being applied to the younger. See **Eocene Period**.

Ol'iphant, Laurence, 1829-88; English traveler, author, and mystic; b. Cape Town, Africa; son of Sir Anthony Oliphant, chief justice of Ceylon; became private secretary to Lord Elgin, Governor General of Canada; later superintendent of Indian Affairs in Canada; private secretary to Lord Elgin on his mission to China, 1857; *charge d'affaires* in Japan, 1861; member of Parliament, 1861-68; joined the semireligious community established by Thomas L. Harris at Portland, N. Y.; abt. 1875 settled at Haifa, Palestine, in the interest of Jewish colonization; works include "The Russian Shores of the Black Sea," "The Land of Gilead," "Scientific Religion," and the novels "Piccadilly" and "Altiora Peto."

Oliphant, Margaret O. Wilson, 1828-97; Scottish author; b. Wallyford; published more than seventy books, including a large number of successful novels and other works of fiction; among them, "Passages in the Life of Mrs. Margaret Maitland," "The Chronicles of Carlingford," "Salem Chapel," "The Perpetual Curate," "A Little Pilgrim: in the Unseen," "Sons and Daughters"; biographies of "Edward Irving," "St. Francis of Assisi," "Thomas Chalmers," and others; "Historical Sketches of the Reign of George II," "Royal Edinburgh," "The Literary History of England from 1790 to 1825," "The Victorian Age of English Literature."

Ol'ive, tree of the genus *Olea* (*O. europæa*); has been grown from the most ancient times, both in Europe and Asia Minor; both fruit and oil form important products of the Mediterranean region, where the bland "sweet" oil replaces butter and other animal fats for table and culinary use; while all over the world it is used for salads as well as for medicinal purposes, in preference to all others. The pickled fruit also is an article of food. The tree is a slow grower, but attains great size and age; some groves have an historic celebrity, and are preserved with scrupulous care. The olive has been extensively propagated in California, where the "mission ol-

ive" was early introduced by the Franciscan missionaries; and that state produces both excellent oil and pickled fruit. Attempts to introduce it into the S. U. S. have not been successful, on account of the occasional severe changes. For oil-making the fruit is not al-



COMMON OLIVE.

lowed to get fully ripe, and should be quickly worked after gathering. It is pulped in tinned-iron mills which do not crush the pits. The finest oil flows from the crushed mass without pressing. The first quality oil of commerce is obtained by pressing the cold pulp in round flat baskets; the pressed cake is broken up, reground, and thinned with cold water; the liquid is allowed to settle in tanks, and the oil floating on top drawn off and filtered. A second pressing yields an inferior quality of oil, and a third or fourth yields an oil used for burning, lubricating, and soap making. Lately a more rapid process of separation by means of a water current in a settling tank has been used with great advantage. The imports for the year 1909 amounted to \$4,900,000. The olive-oil industry has suffered greatly from the adulteration with cheaper oils, especially that of the peanut (*Arachis hypogæa*) and of cotton seed.

Ol'iver Op'tic. See **ADAMS, WILLIAM TAYLOR**.

Oliver, Peter, 1713-91; American jurist; b. Boston, Mass.; held several offices in Plymouth Co., and was appointed a justice of the Supreme Court, 1756; became chief justice, 1771; was impeached by the House of Representatives, 1774, for refusing to subscribe an engagement to receive no pay or emolument except from the assembly; accompanied the British troops on their retirement from Boston, 1776; subsisted some years in England on a grant from the crown.

Ol'ives, Mount of, or **Mount Ol'ivet** (now **JEBEL-EL-TUR**), eminence of Palestine, separated from Jerusalem on the W. by the Valley of Jehoshaphat; is a ridge with three summits; on central one stands the village of Tur, 2,643 ft. above the sea and 384 ft. above the

valley. From this central summit, according to tradition, the ascension of Jesus took place. The Garden of Gethsemane lies on the W. declivity near the foot of the hill. The road to Bethany passes over Mt. Olivet. Christ used to sit here with His disciples, and retire hither alone to rest and pray. Here He passed the last night before He was delivered up to Pontius Pilate.

Olla Podrida (ól'la pō-drē'dā), Spanish, "putrid pot," Spanish national dish, consisting of several kinds of meat cut into small pieces, and stewed with a variety of vegetables. In English the term is used to signify any incongruous mixture.

Ollivier (ô-lē-vē-ā'), **Émile**, 1825-1913; French statesman; b. Marseilles; began to practice as an advocate at Paris, 1847; was sent to Marseilles to pacify the city, 1848, and shortly after was appointed prefect, but, 1849, returned to Paris. In 1857 he was elected to the Legislative Assembly, and made himself conspicuous by his opposition to the government of Napoleon III. Gradually, however, the emperor succeeded in winning him over to his side, and he was generally considered a political renegade, when on January 2, 1870, he became Napoleon's prime minister; was president of the cabinet when war was declared against Prussia, but retired after the first reverses of the French arms; elected to the Academy, 1870; unsuccessful candidate for the Chamber, 1876, 1877, and 1885; published, among other works, "Démocratie et Liberté," "Le 19 Janvier," "L'Eglise et l'État au Concile du Vatican," "M. Theirs à l'Académie et dans l'Histoire," "Nouveau manuel de droit ecclésiastique français," "1789 et 1889," and "L'Empire libéral," a defense of his official conduct preceding the war with Prussia.

Olmsted (ô'm'stēd), **Denison**, 1791-1859; American scientist; b. E. Hartford, Conn.; 1817, appointed professor in the Univ. of N. Carolina, where he proposed and executed the first state geological survey ever attempted in the U. S.; was Prof. of Mathematics and Natural Philosophy in Yale, 1825-36, afterwards of Natural Philosophy alone; published several text-books on natural philosophy and astronomy, and an elaborate theory of hail-storms; demonstrated the cosmical origin of shooting stars, and made a series of observations on the aurora borealis.

Olmsted, **Frederick Law**, 1822-1903; American landscape architect; b. Hartford, Conn.; with Calvert Vaux prepared the accepted designs for Central Park, New York City; spent four years in executing them; in Civil War was member of National Sanitary Commission for care of Union soldiers; chairman California State Commission to take charge of the Yosemite and Mariposa national reservations; designed park systems of Brooklyn, Boston, Bridgeport, Buffalo, Chicago, Louisville, Milwaukee, Kansas City, Montreal, Trenton, and other cities; planned grounds of the National Capitol and of the state reservation at Niagara Falls; publications chiefly narratives of travel.

Olney, Jesse, 1798-1872; American educator; b. Union, Conn.; taught at Whitesboro and Binghamton, N. Y., and for twelve years in the Hartford Grammar School, where he introduced the method, later widely adopted, of separating geography from astronomy, and beginning the former study by familiarizing the pupil with the description and surroundings of his own town, county, and state, advancing thence to national and foreign geography; published a number of schoolbooks that had an enormous circulation, including a "Geography and Atlas" and "The National Preceptor."

Olszewski (ôl-shēv'skī), **Karol**, 1846- ; Austrian physicist; b. Broniszow, Galicia; became Prof. of Chemistry in Univ. of Cracow, 1876; best known for his researches on the liquefaction of the permanent gases; was the first to obtain hydrogen in the liquid state and to determine accurately its boiling point, its critical temperature, and its critical pressure.

Olympia, plain in Elis, Peloponnesus, on the Alpheus, where the Olympian games were held, containing the Altis or sacred grove, said to have been inclosed by Hercules, and which contained the temple of the Olympian Zeus, with his statue by Phidias, and many other public buildings. Connected with the Altis were the stadium and the hippodrome. At the time of the Elder Pliny (23-79 A.D.) about 3,000 statues were standing; now the space is occupied with grain fields, with a few scattered ruins.

Olympia, capital of State of Washington and of Thurston Co.; on Des Chutes River and Budd's Inlet (S. extremity of Puget Sound); 36 m. SW. of Tacoma; in a timber, coal, iron, sandstone, and copper region; laid out with broad and regular streets; has direct steamship communication with the principal points on the sound and the Pacific coast, and is chiefly engaged in industries connected with lumbering. Pop. (1910) 6,996.

Olympiad, period of four years between any two successive celebrations of the Olympian games; early adopted as an era for recording dates of events. The Olympiads were designated by numbers, the first being reckoned from the victory of Coræbus in the foot race, 776 B.C.; or they took the name of the principal victor in the next previous Olympian games.

Olympias, daughter of Neoptolemus I, King of Epirus, wife of Philip of Macedon, and mother of Alexander the Great. Her imperious and jealous nature and the infidelity of Philip caused strife between them; and on the marriage of Philip with Cleopatra, 337 B.C., she fled to the court of her brother Alexander, King of Epirus, whom she incited to make war on Macedon. On the death of Philip she returned to Macedon, and put to death her rival Cleopatra and her infant daughter. In 323, when Antipater was placed in absolute control of affairs on the death of Alexander the Great, Olympias withdrew to Epirus. In 317 she took the field with Polysperchon, the new regent, against Arrhidaeus and Eurydice, whom she de-

feated and put to death. She was at last defeated and captured by Cassander at Pydna, 316, and executed.

Olympic Games, most ancient and famous of the four great national festivals of the Greeks, celebrated once in four years at Olympia. After being discontinued for a considerable period, the Olympic games were reestablished in the ninth century B.C. by Iphitus, King of Elis, and Lycurgus. For more than a century the games continued a local festival, but as they grew in importance spectators came from the more distant states and from the Greek colonies of Asia, Africa, and Europe. As the time approached for the celebration of the games, a sacred truce was proclaimed, and hostilities were suspended throughout Greece. At first the festival was confined to a single day, and consisted of the simple match of runners in the stadium; but in time it was varied by additional contests, such as boxing and wrestling matches, throwing the quoit and the javelin, and horse and chariot racing. From the beginning of the seventy-seventh Olympiad (472) its duration was extended to five days. The games were open to persons of all ranks and occupations, the only conditions being that they should prove a pure Hellenic descent and a good moral character. After the conquest of Greece by the Romans the latter were allowed to become competitors. After the seventh Olympiad the prize was a wreath from the sacred olive tree near Olympia, which, with the honor of being proclaimed victor, was considered sufficient. The Olympic games were abolished by a decree of Emperor Theodosius, 394 A.D. A modern form of Olympic games was instituted at Athens under the auspices of the Greek Govt., 1896; the contests of 1906 were largely and successfully participated in by U. S. athletes. The contests of 1908 were held in the Stadium, Shepherd's Bush, London, July 13-25th. The American athletes in track and field sports swept all before them.

Olym'pus (modern, ELYMBO), lofty range of mountains which separates Thessaly from Macedonia. Their sides are clad with beautiful forests, but the tops are covered with snow for nine months of the year. The highest peak rises 9,754 ft., and on its broad, cloud-veiled summit stood, according to the oldest myths of Greece, the palace of Zeus and the other gods. Later, the abode of the gods was moved by a more refined sentiment to the celestial spheres, but Mt. Olympus still retained its charm for the imagination.

Olyn'thus, ancient city of Macedon; on the Toronaic Gulf; was at different periods dependent on Athens or Sparta, acquired great wealth from its excellent commercial position, but was taken, 347, by Philip of Macedon, who sold the inhabitants as slaves and destroyed its buildings.

O'maha, capital of Douglas Co., Neb.; on the Missouri River; opposite Council Bluffs, Iowa; laid out with wide streets on a plateau 80 ft. above the river, here crossed by three bridges: one of steel, built by the Union Pacific Railroad Company, 66 ft. above the water, cost

\$1,500,000; one of iron, for wagon and street railway use; another of steel, for steam railway use, with longest drawbridge in the world, cost \$1,000,000; has a wholesale trade of over \$100,000,000 per annum, machine, car-building, and repair shops of the Union Pacific Railroad, extensive smelting and refining works, packing houses, breweries, and boiler works, 432 "factory-system" manufacturing plants (1909), with \$45,461,000 capital and products valued at \$80,855,000. The city contains about 150 churches, headquarters of the U. S. military department of the Missouri, U. S. Govt. building, State Institution for the Deaf, Creighton College (Roman Catholic), Brownell College (Protestant Episcopal), Normal Industrial College, St. Catharine's Academy (Roman Catholic), Academy of the Sacred Heart (Roman Catholic), the Clarkson Memorial, Presbyterians, Methodist Episcopal, Douglas County, and St. Joseph hospitals, and other educational and benevolent institutions. Omaha is named from a tribe of Indians; was laid out on a large scale, 1854; was the first territorial capital, and was the scene of a Trans-Mississippi and International Exposition to show the development and resources of the Middle West, 1898. Pop. (1910) 124,096.

Omahas, members of a tribe of N. American Indians, belonging to the Dakota family; found by Marquette, 1673; Carver, 1766; Lewis and Clarke, 1805; since Logan Fontanelle, their great chief, was killed by the Sioux (1855), they have devoted themselves to agriculture; now number about 1,200, on reservation in E. Nebraska.

Oman (ô-mân'), independent state, but practically under British protection, in SE. Arabia; has a coast line of about 1,500 miles along the Persian Gulf, the Gulf of Oman, and the Arabian Sea; contains eight badly defined districts or states, of which Muscat is the most important; area, 82,000 sq. m.; est. pop., 800,000, chiefly Arabs; capital, Muscat. It was formerly a part of a powerful and extensive Arabic state or imamat, which consisted of Arabic, Persian, and African territories, but which, 1854, at the death of the Imam Said Seid, was divided between his two sons, one receiving the African territories and the other the Asiatic territory.

Omar (ô'mér) I (ABU HAFSAB AL-KHATTAB), abt. 581-644; second caliph of the Mussulmans, third cousin of Abdallah, father of Mohammed; succeeded Abubekir, 634; adopted the Hejira as the beginning of the Mussulman era; was the first to assume the title "Commander of the Faithful"; under him the Moslem arms were everywhere victorious; assassinated at mosque in Medina; succeeded by Othman.

Omar II (ABU HAFS), d. 720; eighth caliph of the Ommiyads; descendant of the preceding; succeeded Solyman; to reconcile houses of Omar and Ali, revoked the maledictions against the partisans of the latter, which had been read in all the mosques since the time of Moawiyah; but members of the ruling family poisoned him.

Omar Khayyam (khî-yām'), full name, GHĪAS UDDIN ABUL FATH OMAR BIN IBRAHIM AL-KHAYYAM, abt. 1025-1123; Persian poet, mathematician, astronomer, and philosopher; b. Naishapur, Khorassan. The epithet of Khayyam ("tent maker") is presumably due to his father's or to his own calling. Favored at court by the Vizier Nizam ul Mulk, he pursued his studies on an annuity; produced a work in Arabic on algebra which was a standard for several centuries; was made astronomer royal to the Sultan Malikshah, 1074, and was instrumental in reforming the Persian calendar. Some 500 of the "Rubaiyat" or "Quatrains" are attributed to his pen, and through their translations Fitzgerald and others have made him immortal. His tomb at Naishapur is shown to travelers.

Omar Pasha (pā-shā'), MICHAEL LATTAS, 1806-71; Turkish general; b. Plaski, Croatia; son of an Austrian officer; deserted from the Austrian army, 1826; became a Mohammedan in Bosnia; entered the Turkish service, 1834. In 1848 he was commander in Wallachia, and, 1849-50, put down the insurrection in Bosnia. He was made generalissimo on the outbreak of the War of 1853; was successful in many actions on the Danube and in the defense of Silistria (1854), and was afterwards Governor General of Bagdad. He invaded and pacified Montenegro, 1862, and was stationed at Shumla till March, 1867, when he was ordered to crush the Cretan insurrection; but his violence caused his recall in October. In 1868-69 he was Minister of War, and later member of the Imperial Council.

Ombay (ôm-bī'), island of Malay Archipelago, Solor group, N. of Timor; 65 m. long, 12 m. broad; high, volcanic, and inhabited by savage tribes of a mixed negro and Malay origin; the Dutch have a settlement and carry on some trade in wax, edible birds' nests, and pepper.

Omdurman (ôm-dôr'mān), capital of the Mahdist territory, opposite Khartum; at junction of the White and the Blue Nile; was a small village until after Khartum fell into the hands of the Mahdists (January 28, 1885), when the Mahdi decided to destroy Khartum and make his capital at Omdurman. The town was soon the center of trade of all the territory controlled by the Mahdi and his successor, the Khalifa. The buildings were mostly mere huts and the conspicuous structure was the Mahdi's tomb. The most important center is the market, in which is collected merchandise from all parts of the Anglo-Egyptian Sudan; cloth dealers, druggists, green grocers, and salt and meat vendors all have their special quarters, as well as the goldsmiths and silversmiths, blacksmiths, carpenters, tailors, and barbers. Omdurman fell into the hands of the Anglo-Egyptian army September 1, 1898, after a hard battle, in which some thousands of dervishes were killed, while the Khalifa sought safety in flight. The seat of government was then again fixed at Khartum. Pop. abt. 41,600.

O'men, among the ancient Romans, a sign by which the gods were believed to indicate their

favor or opposition to any proposed public or private action. The omens were publicly observed by the magistrates, assisted by haruspices and augurs, the former observing signs of the first, the latter of secondary importance. In the time of Cicero, and even before it, the whole matter of taking omens, of divining, soothsaying, and the like, had fallen into disrepute among the intelligent, but with the vulgar these arts were still of importance up to the time of the later empire.

Ommiades, or **Ommiyades** (ô-mī'adz), second dynasty of Oriental caliphs, beginning with Moavia, son of Abu Sofian, 661, and continuing until 750. They derived their name from Ommaya, an ancestor of Moavia. After the assassination of Ali, Moavia gained possession of the whole empire, and the caliphate remained in the possession of his family until the defeat and death of Merwan II, the fourteenth sovereign (750). After this all the Ommiades were treacherously slain but two, one of whom fled to Arabia, where his descendants ruled as late as the sixteenth century; the other founded the Kingdom and subsequent Caliphate of Cordova in Spain as Abderrahman I.

Om'nibus. See CARRIAGES.

Omnis'cience, attribute of God, in consequence of which He knows of all that has been, all that is, and all that shall be. In its last phase, as foreknowledge, it has occasioned several very subtle theological distinctions.

Om'phale, in Greek legends, daughter of the Lydian king Jardan, and wife of Tmolus, whom she succeeded in the government. Mercury sold Hercules to her for a slave, and by him she had several children.

Omsk, capital of government of Omsk, Siberia; at confluence of the Om and the Irtysh; contains military schools, hospitals, manufactories, and mining works, and is the residence of the governor general. Its fortress, constructed 1766, is the strongest in W. Siberia. Pop. (1900) 37,376, exclusive of the garrison.

On, name applied by the Hebrews (Gen. xli, 45, 50; xlv, 20) to the famous city of the suh, Heliopolis, which was also known by them as Beth-Shemesh, House of the Sun (Jer. xliii, 13), of which Heliopolis is simply a translation. The same Hebrew letters that spell On when differently vocalized give *Aven* (Ezek. xxx, 17), which thus becomes, erroneously, a second Hebrew name of Heliopolis.

On'ager, species of wild ass inhabiting the plains of central Asia; is reddish in summer, gray in winter, with a streak of black along the center of the back, crossed by a second bar over the shoulders.

One'ga, large lake in government of Olonetz, W. Russia; next to Lake Ladoga, is the largest lake of Europe, covering an area of 4,830 sq. m.; is connected with the Volga and the Dwina by canals, and communicates with Lake Ladoga by the Sweer. Onega is also the name of a river of N. Russia not connected with the lake, but occupying the basin next E.; also of a

town near the mouth of this river, and of the great bay of the White Sea into which this river empties.

Oneida (ō-n'ā) Community, society of religious communists, consisting of about 300 members, formerly established on Oneida Creek, Madison Co., N. Y. At the time of its dissolution, 1881, it owned a fine estate of 650 acres, also a commodious mansion, and several mills and manufactories. A smaller branch society was located at Wallingford, Conn. The founder of the community was John Humphrey Noyes, who was licensed to preach, 1833. In 1834 he announced himself a "Perfectionist." He and his followers held that salvation from sin consists in the destruction of selfishness by means of spiritual intercourse with God. The practical application of his doctrines was made in the two communistic societies. The members practiced community of women as well as of goods; maintained the equality of women with men in social and business life; lived in a "unitary home"; and engaged in manufactures and farming. After the dissolution of the community at Oneida the members were incorporated under the laws of New York State as a joint stock company, in which capacity they have since carried on the business of the Old Community.

Oneida Lake, body of water in Oneida, Oswego, Madison, and Onondaga cos., N. Y.; 20 m. long and 6 m. wide; surface, 369 ft. above the sea; abounds in fish; formerly, with its outlet, Oneida River, was the channel of an important navigation, but is superseded by railways.

On'ion, cultivated biennial herb and its bulbous foot, the latter composed of leaf elements in a thickened condition; the *Allium cepa*, a plant of the order *Liliaceae*, cultivated in Egypt and Asia from immemorial time, and thence introduced into nearly all civilized countries. The onion differs from the garlic especially in having the elements of its bulb disposed in concentric layers and not in separate cloves. Among the marked types are the potato onion, grown from offset bulbs growing near the root, and the top onion, produced from similar bulbs growing at the top of the flower stalk. Ordinary onions are raised in the first season from seed, or in the second year from the small sets or incompletely grown bulbs of the previous year's crop. The onion has an aromatic sulphur oil containing allyl. The bulb is highly nutritious.

Onondaga Lake, body of water in Onondaga Co., N. Y.; 5 m. long, 1 m. wide; maximum depth, 65 ft.; S. part very shallow; waters stagnant, and their level is 361 ft. above tide; flows into Seneca River. The lake has a natural puddling of marl, which keeps the brine of the Onondaga limestone from its waters.

Ontario (formerly UPPER CANADA), wealthiest and most populous province of the Canadian Dominion; bounded N. by Keewatin, the Albany River forming a part of the line, and James Bay; E. and N.E. by the Ottawa River and Quebec; SW. and S. by the Rainy River (a part of the boundary with Minnesota),

Lakes Superior, Huron, St. Clair, Erie, and Ontario, with their connecting waters, and the St. Lawrence; W. by Manitoba and the Lake of the Woods; land area, 220,508 sq. m.; water area, 40,354 sq. m.; pop. 2,523,208; chief cities: Toronto (capital), Hamilton, Ottawa (capital of the Dominion of Canada), London, Kingston, Brantford, Guelph, St. Thomas, Windsor, Belleville, Stratford, St. Catharines. Surface nowhere exceeds 1,000 ft.; province is crossed by the Laurentian Hills, trending to the NW., though now reduced to a hummocky plateau, locally termed the Height of Land; interior lakes many, including Nepigon, N. of Lake Superior; Nipissing, Muskoka, and Simcoe, all E. of Georgian Bay. Climate warm in summer and cold in winter; cold extreme only in the uninhabited N. portion, while even there the rigor is moderated by the snowfall and the absence of blizzards; mean temperature in summer at Port Arthur (head of Lake Superior), 65.3°; Ottawa, 65.3°; Toronto, 64.1°; mean temperature in winter at these places: 9.0°, 15.4°, 24.6°; annual rainfall in province, 30 to 40 in.

Chief agricultural products: hay and clover, oats, wheat, peas, potatoes, barley, corn, rye, buckwheat, root crops; abundant crops of apples, pears, plums, cherries, grapes, and (in the Niagara district) peaches, and of all the small fruits. The breeding of horses, stock raising, dairy farming, and bee culture are leading industries. Mineral products include iron ore, nickel, copper, gold, silver, lead, zinc, galena, plumbago, mica, apatite, granite, marble, freestone, clays for terra-cotta and brick, phosphates, salt, petroleum, and natural gas; manufactures include lumber, iron and hardware, steam engines and locomotives, cotton and woolen goods, linen, furniture, agricultural implements, sewing machines, wagons and carriages, wooden ware, paper, soap, starch, leather, boots and shoes, and hats and caps.

Of the canals necessitated by the vast inland navigation of Canada, those of the St. Lawrence system, over 70 m. in length, lie almost wholly within this province. The Welland Canal connects Lakes Erie and Ontario; the Murray Canal, the Bay of Quinte and Lake Ontario; the Rideau Canal, 126 m., connects the Ottawa River with Lake Ontario; St. Mary's Canal, with lock 900 ft. long, gives access to traffic in its passage in and out of Lake Superior.

Leading religious denominations: Methodist, Presbyterian, Anglican, Roman Catholic, Baptist, Lutheran, Congregational, Salvation Army. Chief educational institutions: Toronto Univ., with which are affiliated Victoria Univ. (Methodist), Knox College (Presbyterian), St. Michael's College (Roman Catholic), Wycliffe College and Trinity Univ. (Episcopalian). Queen's Univ. (Presbyterian) is at Kingston; McMaster Univ. (Baptist), at Toronto; Woodstock College (Baptist), Woodstock; Alma College, at St. Thomas; Ontario Agricultural College, at Guelph; Huron College and Western Univ., at London. Ontario, first settled by the French, became under British rule a part of the province of Quebec on its organization, 1774, and, 1791, W., or upper

Canada. Thousands of American loyalists settled here at the close of the Revolutionary War. Toronto was founded 1793, and has since, with an occasional brief interruption, been the provincial capital. The union of the two Canadas, 1841, proved unfortunate, for to the strife of political factions was added a war of races which made legislation impossible and brought about political deadlock. The solvent was confederation, which took place, 1867, and made upper Canada (now Ontario) a self-governed province of the Dominion.

Ontario, Lake, smallest of the Great Lakes drained by the St. Lawrence; area (U. S. Survey), 7,104 sq. m.; another estimate from the same data, 7,240 sq. m.; mean elevation of the surface of the lake, 247 ft., and 326 ft. lower than the surface of Lake Erie; maximum depth, 738 ft.; lake, 190 m. long and 55 m. wide; discharge estimated at 300,000 cu. ft. per second. Lake Ontario is connected with Lake Erie by the Welland Canal and with Montreal by the St. Lawrence, which can be descended by steamers, the return being accomplished by means of a series of canals. The lake seldom freezes except near the shore, and is the highway of an extensive commerce.

Ontogeny, term introduced by Haeckel, and now in general use, for the development of the individual, as opposed to phylogeny or the development of the race. See **PHYLOGENY**.

Ontology, science of being in general or of the essence of things; sometimes identified with metaphysics, but usually made one of its divisions, and coordinate with rational psychology, cosmology, and theology. The general problem of ontology is to find the highest principle, or that which is true in and for itself—the Absolute. See **METAPHYSICS**; **PHILOSOPHY**.

Onyx, variety of chalcedonic quartz, composed of parallel layers of chalcedony of some shade of brown, green, red, or other color alternating with layers of white. When the red is a rich brownish-red chalcedony (*sard*) and the white bands pure and translucent, the variety is known as *sardonyx*; when quartz and gray chalcedony are in combination, *chalcedonyx*; when the ground is black and the bands are very thin and grayish white, *onico*. The varieties of onyx were highly prized by the ancients for the manufacture of cameos, the supposed largest known, measuring 11 in. by 9, preserved in the Museo Borbonico at Naples; other great cameos are at Vienna, the British Museum, and the Bibliothèque Nationale, Paris. Onyx is now much used in jewelry. *Mexican onyx*, so called, is like aragonite; it is formed on the floors of caves, being the result of a deposition of calcareous waters, either cold or hot, between the successive layers of which the iron and manganese is deposited. It was used in carving by the ancient Mexicans, but was first brought to general notice at the Centennial Exposition at Philadelphia in 1876, where a magnificent series of specimens was shown by the Mexican commission. On account of the softness of the material it can be readily carved with a knife, and in Mexico is extensively worked into trays, crucifixes, etc.

O'olite. See **LIMESTONE**.

O'pah. See **KING FISH**.

Opal, gem consisting of natural silica and containing some water, sometimes up to eleven per cent; is never crystallized, but always amorphous, with a marked conchoidal fracture; several varieties recognized, of which *precious* or *noble opal* is the most highly prized. Its value arises from its exquisite play of colors. The general aspect is whitish or milky, and the opalescence consists of countless gleams of many-colored light or "fire." A more transparent variety, with broader reflections of color—red, yellow, blue, green, or violet—is more brilliant, though less highly prized as a gem, and is known as *fire opal* or *girasol*. The name *lechosos* is given to those showing much green light, and *zeasite* to those that have much red. The noble and the fire opal are the only kinds used in jewelry.

Op'era, drama sung with accompaniment of instrumental music. Dramas occasionally interspersed with songs to familiar airs are called vaudevilles; dramas occasionally accompanied by instrumental music are called melodramas. On its dramatic side the form of the opera does not differ widely from that of the spoken drama. Inasmuch, however, as it is to be sung, the text of an opera, the *libretto*, must be of much smaller extent than that of an ordinary drama. The first work entitled to be called an opera was Ottavio Rinuccini's drama of "Eurydice," set to music by Giacomo Peri, of Florence, and performed 1600. The opera soon became a popular species of musical composition in Italy. In 1645 it was established in France by Cardinal Mazarin. The establishment of the Italian opera in England may be dated from the production of Handel's "Rinaldo," 1711. Bononcini's "Almahide," 1720, was the first opera sung there entirely in Italian. The long list of Italian opera composers includes Scarlatti, Piccini, Cimarosa, Donizetti, Verdi, and the moderns Mascagni and Puccini. In Germany, Gluck was the first to introduce extensive reforms. Among the composers who since his time have done most for the operatic stage are Mozart, Meyerbeer, Von Weber, and Wagner among the Germans. To Weber especially will remain the glory of having first sounded a distinct German operatic style. Wagner is the successor of Weber in more than one sense. Among composers who have written solely or mainly for the French stage are Méhul, Cherubini, Spontini, Meyerbeer, Rossini, Gounod, and Thomas. Perhaps, however, it is in the lighter style of opera that the French have excelled. The first composer of the *opéra comique*, strictly so called, was A. F. Boieldieu. Other writers of this lighter style are Hérold, Halévy, Auber, Adam, and Offenbach. The modern French opera composers, Massenet, Saint-Saëns, Bizet, etc., are really to be classified with the modern German school, so far as the harmonic treatment of their various works is concerned, and also their modes of orchestration. The Italians divide operas into four classes, sacred, serious, semiserious, and buffo or comic; the French

recognize two divisions, the *grand opéra* and the *opéra comique* (including *opéra bouffe*), the latter of which is partly spoken. See CANTATA; ORATORIO.

Opera Glass, portable instrument for magnifying objects at a distance, and consisting essentially of two parallel telescopes, with a double convex lens for an object glass and a double concave eyepiece which is focused by a rack and pinion. If the eyepiece were a double convex lens, as it is in the astronomical telescope, the instrument would be too long for carrying, but this difficulty has been overcome by inserting a pair of prisms, so that the path of the ray of light is doubled upon itself, thus affording, optically, a greater distance between the lenses and a larger erect image than was formerly obtainable.

Ophid'ia. See SERPENTS.

O'phir, region from which the fleet of Solomon brought gold and precious stones. It has been variously identified with the African coast of Zanzibar and Mozambique, where mines of gold and silver appear to have been worked extensively in ancient times; with S. Arabia, which contains a city named El-Ophir, once the seat of considerable Arabian commerce; and with India, which abounds in the articles mentioned as brought from both Tarshish and Ophir.

Ophites (ὄφίται), or Serpent-worshippers, sect of Gnostics who joined the worship of the serpent to the general characteristics of the faith and practice of other Gnostics. They honored the serpent because he tempted Eve to eat of the forbidden fruit—an act which they believed to be advantageous to the human race. They kissed the serpent and fed it with the eucharistic bread; but others rejected Christianity, and honored Cain, Judas Iscariot, and other wicked personages.

Ophiur'ans (*Ophiuridae*), family of starfishes in which the five rays are long, slender, flexible, and snakelike, whence the name; in some the arms are very fragile; the common name of the genus *Ophiura* is sand star, from their habit of hiding in the sand. The genus *Astrophyton* of the N. American coast has so great a number of terminal subdivisions, like snake hairs, that it has been called Medusa's head; it is also called fisherman's basket, from occasionally having, when caught in deep water, fish and other animals embraced in the numerous flexible rays.

Ophthalm'ia, a term which should be restricted to inflammations of the conjunctiva—i.e., the membrane lining the eyelids and covering the exposed surface of the eyeball. It is synonymous with conjunctivitis, and is divided into *simple* or *catarrhal*, *purulent*, *membranous*, *phlyctenular*, and *granular ophthalmia*.

Catarrhal ophthalmia is the mildest form of inflammation of the conjunctiva. It may be caused by overuse of the eyes, by the contact of irritating substances, by riding in the wind, and by "catching cold," or it may be associated with certain diseases. The symptoms are inability to use the eyes, a feeling of a

foreign body in the eye, and the development of a secretion, at first mucous and afterwards muco-purulent, which gums the eyelids together. Usually there is not much dread of light. This affection does not imperil the eyesight if properly treated. The disease, if the secretion is free, is markedly contagious. Some of the special varieties of it are distinctly epidemic; one, often occurring in the spring and fall, should be known as epidemic conjunctival catarrh, but is vulgarly called "pink eye." Mild cases of catarrhal ophthalmia should be treated by removing the cause, washing the eyelids and eyes frequently with soap and water, and keeping the discharge cleaned away with some mild collyrium; an excellent one is a solution of common table salt in the proportion of a teaspoonful to the pint. Boracic acid and borax are much used for the same purpose. In the severe types very decided treatment may be necessary.

Purulent ophthalmia is a very dangerous disease. It is customary to describe it under two forms, as it occurs in the new-born, *ophthalmia neonatorum*, and in adults, *gonorrheal ophthalmia*. An inflammation of this kind is due to contagion occurring either during the birth or immediately after it. When a similar inflammation occurs in adults it is also due to contagion carried to the eye by soiled fingers which have been in contact with a discharge in which certain microorganisms exist. Only the most vigorous and active treatment will save such eyes from destruction. **Membranous ophthalmia** is a violent inflammation of the conjunctiva, in which a false membrane forms upon its surface. It is most often seen in connection with diphtheria, and is almost sure to mar the sight of the eye. **Phlyctenular ophthalmia** is an inflammation of the conjunctiva which is characterized by great dread of light, and, in addition to the ordinary symptoms of conjunctivitis, the formation of minute blisters, or pimples, which scatter themselves over the conjunctiva, or are arranged around the margin of the cornea.

Granular ophthalmia or **granular lids** (synonyms, *granular ophthalmia*, *granular conjunctivitis*, *trachoma*), an inflammation of the conjunctiva, in which the membrane loses its smooth surface owing to the formation of "granulations," or yellowish-red, rounded bodies, which after absorption leave cicatricial changes. Certain individuals are predisposed to the disease, and, although there is no known constitutional disorder which causes it, a large amount of evidence has accumulated indicating the dependence of granular lids upon the presence of a special form of microorganism, which is known as the *trachomacoccus*. The contagious nature of the affection is undoubted.

The treatment of granular lids consists in the application of such remedies as will cause absorption of the "granulations." For this purpose caustics are used. In many cases it becomes necessary to operate. Under certain circumstances electricity is applied.

Ophthalmology, science of the eye, including its anatomy, functions, diseases, and treatment. See EYE.

O'pie, John, 1761-1807; English painter; b. St. Agnes, near Truro; practiced without instruction at Truro, and, 1781, went to London, where he was named the "Cornish wonder." Hardly a year had passed before he had painted the principal nobility; but his portraits lacked elegance and refinement, and his popularity sank almost as suddenly as it had risen; then applied himself to historical painting, in which he produced several popular pictures; 1806, was elected Prof. of Painting at the Royal Academy.

O'pitz, Martin, 1597-1639; German poet; b. Bunzlau, Silesia; lived at various German courts; ennobled by Emperor Ferdinand II, 1627, under the name of Opitz von Boberfeld; became historiographer to Ladislaus IV of Poland; rendered important service to German literature, especially in refining the language; founded the first Silesian school of poetry.

Ophthal'moscope, an instrument for observing the internal structure of the eye. It consists of a mirror (plane in that of Coccious, concave in that of Desmarres), by which light from an artificial source is directed into the eye of the patient, and a double-convex lens, by which the illumined parts of the structure of the eye are magnified in order that they may be more easily examined, the observer looking through a hole in the center of the mirror. The light is usually placed to the side of and slightly behind the patient's head.

O'pium, a drug, the thickened juice of the capsules of the white poppy, *Papaver somniferum*, and its varieties. It is probable that the collecting of opium began in Asia Minor, and gradually extended to other countries; it is now supplied by Asia Minor, Persia, India, China, and Egypt, while experiments in its production have been made in Europe, Algeria, Australia, and several of the U. S., including California. It is obtained by making a shallow horizontal incision in the unripe poppy head a few days after the fall of the petals; the milky juice that oozes from the cuts is scraped off and made into lumps. Good Turkey opium is a hard, tenacious solid of compact texture and a reddish-brown or fawn color. It has a strong, peculiar odor and a rather bitter, somewhat acrid, taste. Its medicinal virtues reside in certain alkaloids, of which *morphine* is the most important, as it occurs in greatest quantity and most perfectly represents the properties of the crude drug. This alkaloid was discovered by Sertürner, an apothecary in Hanover, in 1816. It exists in opium combined with a peculiar acid called *meconic*, and in good Turkey opium is found in the proportion of from twelve to fifteen per cent. Pure morphine exists in small, colorless, shining crystals, inodorous, but of a bitter taste. The other alkaloids of opium known to affect the human system are *codeine*, *narcotine*, *narcotine*, and *papaverine*, but twelve besides these have been obtained from the drug, although they seem to be only chemical and physiological curiosities. *Thebaine*, for instance, produces in the lower animals violent tetanic convulsions, and *cryptopine* wild delirium with dilated

pupils. Besides these sixteen alkaloids, a neutral principle, *meconine* or *opiaryl*, and pectine, albumen, mucilage, sugar, and wax are all constituents of opium.

The symptoms of opium poisoning are deep coma, with flushed or pale face, contracted pupils, slow, stertorous breathing, and slow, full pulse. Death occurs from stoppage of breathing through paralysis of the respiratory center in the medulla oblongata. The treatment, after evacuation of the poison left in the stomach, is especially directed toward keeping up the breathing. The patient is aroused by any means, however rough; hot black coffee is given freely. If in spite of all means he sinks into coma and respiration begins to fail, artificial breathing and hypodermic injections of strychnine are cautiously employed. No case should be given up till actual death. The pharmaceutical preparations of opium are very numerous: the two most familiar are *laudanum*, a simple tincture of opium, of which 13 minims (about 25 drops) is the equivalent of a grain of opium; and *paregoric*, a camphorated tincture, compounded of opium, camphor, benzoic acid, oil of anise, honey, and dilute alcohol. Half a fluid ounce of this tincture represents very nearly a grain of opium. The salts of morphine are also very largely used, and their administration in solution by hypodermic injection has in certain circumstances advantages over opiates given by the mouth. Opium smoking began in China in the latter half of the seventeenth century, and, in spite of the government's efforts to prevent it, became a national practice. Attempts to prevent its importation led to the Opium War with Great Britain, 1840-42. Since 1906 China has taken measures to restrict cultivation. An agreement with Great Britain, 1911, forbids conveyance of opium from India to any province in which cultivation has been suppressed; the traffic is expected to disappear by 1917.

Opodel'doc, liniment used as an anodyne application in sprains, bruises, and rheumatic pains; prepared by dissolving 3 oz. of common white soap in a pint of alcohol, and adding an ounce of camphor and a fluid dram each of oil of rosemary and oil of origanum.

Oporto, capital of province of Minho, Portugal; on the Douro; 174 m. NE. of Lisbon; has an excellent harbor, lined with elegant quays and crossed by many beautiful bridges; is one of the most picturesque cities in the world, built on a steep declivity, which it climbs through terraces covered with strikingly colored houses. Among the buildings, the cathedral, the Gothic Church of Cedofeita, the bishop's palace, and the Hospital of St. Anthony are most noticeable. Oporto possesses a polytechnic academy, medical school, school of art, and library. There are manufactures of gold and silver ware, glass, pottery, leather, linen, woolen, silk, and cotton fabrics, and tanning, brewing, distilling, cork cutting, and sugar refining are carried on. The principal article of exportation is the so-called port wine, red and white. Pop. (1900) 167,955.

Opos'sum (American Indian name), any animal of the family *Didelphidae*, a group of mar-

supial mammals peculiar to America. The most familiar species is the common Virginia opossum, *Didelphys virginiana*. It has a pointed head, many sharp teeth, large and naked ears, small eyes, a long, tapering, flexible, and



OPPOSUM.

prehensile tail, and its toes are armed with sharp, strong claws. It has a well-developed pouch, is about the size of a large cat, is much hunted for food and for its skin, and has a remarkable habit of feigning death when captured, hence the proverbial expression, "playing 'possum."

Op'pius, Gaius, intimate friend of Julius Cæsar, who intrusted to him and Balbus the management of affairs while he was absent in Spain; was author of lives of Cæsar, Cassius, Scipio Africanus the elder, which are only known to us through citations.

Op'tic Nerve. See EYE.

Op'tics, science that treats of the phenomena of light. The theory that vision is produced by means of rays coming from the eye to the object was taught in the school of Plato. The elementary phenomena of reflection and refraction suggest a natural division of the science of optics into two principal branches, and this distinction was made by Euclid, who lived about 300 B.C. The general laws which govern the reflection of light, being comparatively easy of detection, were described by him with tolerable correctness; but what he has written on refraction is of little value. Ptolemy, the astronomer of Alexandria, who was born abt. 700 A.D., tried to discover the laws of refraction by experiment, and his results are recorded in his "System of Optics."

About the beginning of the seventeenth century Galileo invented the telescope, and by its means made important discoveries. Shortly afterwards Kepler explained how the focal lengths of lenses could be found, and gave the true theory of the telescope; he also made experiments on the nature of colors, and showed that the images formed on the retina of the eye are inverted. Willebrord Snellius, Prof. of Mathematics at Leyden, who died in 1626, left a statement of the law that determines the path of a ray in passing from one medium to another. This law was first pub-

lished by Descartes, eleven years after the death of Snellius, and therefore it is frequently called the law of Descartes.

The next step in the progress of optical discovery was made by Newton, who in 1672 described the experimental researches by which he established the compound nature of light, as well as the unequal change in direction of its component rays, known as refrangibility. This phenomenon of the separation of the component colors of light by refraction has been called *dispersion*. It furnishes an easy explanation of the interesting natural phenomenon of the rainbow. In 1665 there was published at Bologna a work by Francis Maria Grimaldi, an Italian Jesuit, in which were for the first time described the phenomena now familiar under the name *diffraction*. They were carefully studied by Newton and others, and have occupied a prominent place in all the discussions that have since arisen in regard to the nature of light. In 1669 Erasmus Bartholinus, a physician of Copenhagen, published a case of new and extraordinary refraction which he found took place in crystals of calcium carbonate (Iceland spar), a species of refraction which, from the circumstance of its dividing an incident beam into two beams entirely distinct, or of presenting two images of any object seen through the crystal, has been called double refraction. This phenomenon was more fully explained by Huyghens, who also was the first to announce the undulatory theory of light. Soon after Newton's publication of the compound nature of light he gave to the world the results of his investigations in regard to the colors exhibited by thin plates of transparent substances.

The discovery of the progressive propagation of light and the determination of its velocity followed. Near the close of the eighteenth century Wollaston discovered that by using a pencil of light, very narrow in the direction of the plane of refraction but broad when parallel to the axis of the prism, several well-defined, dark, straight lines could be distinguished crossing the spectrum at right angles and maintaining invariably the same positions relatively to the colors. In 1810 a prize offered by the French Academy of Sciences for solving the problem of the double refraction of light was won by Malus. To him is also due the discovery of polarization of light by reflection. (See POLARIZATION.) In 1811 Arago announced that on examining thin plates of certain transparent crystals by means of transmitted polarized light, he found that when the light was received through a prism of Iceland spar colors made their appearance which were complementary to each other in the two images, and which varied in intensity with the azimuth of the laminae or of the prism. When a doubly refracting prism was used as an analyzer, the two images seen were constantly complementary in color, and as the analyzer was turned they ascended in tint, in the order of Newton's scale, from red to violet.

The peculiar kind of polarization produced by quartz has been called *rotatory* polarization. In 1815 Biot discovered that many liquids possess this power of rotatory polariza-

tion. Arago early made the discovery that the light which comes to us from the atmosphere is polarized. Brewster also made investigations concerning the double refraction of crystals. He found that for the most part those substances which do not have the same physical properties in every direction are doubly refracting, and have two axes. The determination of the undulations in such bodies, or the form of their "wave surface," was, approximately at least, effected by Fresnel. It led to Sir William Hamilton's prediction, which was experimentally verified by Lloyd and others, that in one case a single ray passing through a plate of a biaxial crystal—that is, one with two optic axes—comes out as a hollow cone; in the other case a single ray which falls upon the plate is transformed into a cone inside the crystal, and comes out as a hollow cylinder. Fresnel also discovered that glass and other simply refracting bodies are rendered doubly refracting when in a state of strain, and Clark Maxwell showed that shearing stress applied to viscous liquids renders them temporarily doubly refracting. See LIGHT.

Optimism, doctrine that the world is the best possible, or that evil is only relative and contingent, being incident to the evolution of good—that good is substantial, evil only temporary. It is the philosophical counterpart to the religious doctrine of an overruling Providence that brings good out of evil. The optimistic theory finds place in the theory that God creates the world from nothing (chaos or pure space) and makes it in some sort His manifestation or self-revelation. Opposed to this is the emanation theory characteristic of Oriental thinking, in which the Absolute is an abstract unity devoid of attributes, impersonal, and above multiplicity, and all creating is removal from unity toward multiplicity, and hence evil. See PESSIMISM.

Oracle, term applied to answers given by the ancient Egyptian and Greek deities when consulted by their votaries, and also to the places where they spoke. Oracles spoke in different ways—in some cases through a human being, who uttered words of inspiration (*e.g.*, at the oracle of Apollo at Delphi); in others by signs, which the priests watched and interpreted (*e.g.*, at the oracle of Zeus at Dodona); then by dreams, as in the temples of Asclepius; and, lastly, by calling up the shades of the dead, as when Odysseus consulted the shade of Teiresias. The answers of the oracles were usually so ambiguous that the gods lost no prestige even though the enterprise they seemed to favor miscarried.

Oran (ō-rān'), seaport of Algeria; capital of department of same name; on Gulf of Oran; 266 m. WSW. of Algiers; strongly fortified; harbor inferior to that of Mers-el-Kebir, 3 m. distant; general appearance of a French city; contains a Roman Catholic cathedral, noteworthy morgue, college, seminary, military hospital; originally built by the Moors; made penal settlement by Spaniards, 1509; taken by Turks, 1708; again by Spaniards, 1732; destroyed by earthquake, 1790; abandoned by

Spaniards; reoccupied by Turks, 1792; rebuilt; occupied by the French since 1831; pop. (1906) 100,499.

Or'ange, Prince of. See WILLIAM OF NASSAU.

Orange, city in Essex Co., N. J.; on the slope of Watchung Mountain; 4 m. NW. of Newark, 12 m. W. of New York City; settled as a part of Newark, 1666; created township, 1806; divided by separation of E. Orange and Fairmount, 1862-63; incorporated as a city, 1870; is a noted residential place, largely of business men of New York City; contains Orange Memorial Hospital, public library, House of the Good Shepherd, orphan home, Masonic Temple, and soldiers' monument, and is principally engaged in the manufacture of hats and electrical supplies. Llewellyn Park, extending from the base to the summit of the First Mountain, comprising 750 acres, and containing many fine residences; Eagle Rock (in county park reservation), 650 ft. above tide water, in W. Orange, from which New York City and harbor may be seen; and Hemlock Falls, the wildest mountain part of S. Orange, are among the attractions of the city and its immediate vicinity. Pop. (1910) 29,630.

Orange, or **Gariép** (gā-rēp'), largest river in S. Africa, S. of 20° lat.; 1,150 m. long; rises on the W. slope of Mont aux Sources in the Drakenbergs; runs through Basutoland; receives in the upper two fifths of its course all its chief tributaries, the Caledon and Vaal being most important; then flowing W. through a wide semiarid region loses much of its volume through evaporation, and in its lower course is often fordable.

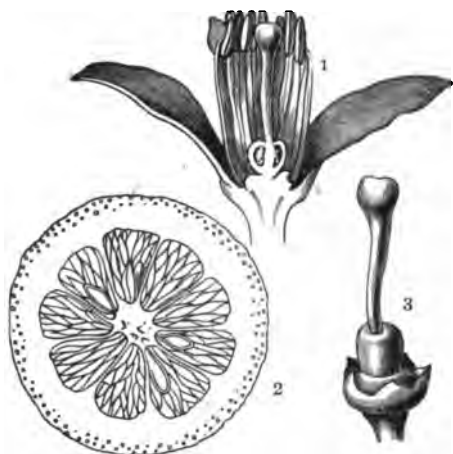
Orange, fruit of many varieties of the genus *Citrus*. The oranges of the U. S. represent two species, the common type, *C. aurantium*, and the mandarin or kid-glove type, *C. nobilis*. The bitter or Seville orange is a form



ORANGE.

of *C. aurantium*. *Citrus* is a genus formerly placed in the family *Aurantiaceae*, but now included in *Rutaceae*, or the rue family. It embraces trees and shrubs, all exotic and unable to endure the climate of the N. states.

In the extreme S. parts of the U. S. the orange is productive. The foliage is fragrant, and the flowers are pure white, odorous, and beautiful. The fruit is a juicy and luscious berry with a leathery rind. This rind contains little cells filled with a fragrant and volatile oil which is easily inflammable. The branches of the trees are spiny, and the leaves in reality compound.



1. SECTION OF FLOWER. 2. SECTION OF FRUIT.
3. MAGNIFIED PISTIL.

Navel oranges, introduced from Brazil, are seedless. Blood oranges are so called from their dark-red juice.

The original of the orange came from the E. Indies or from China. The orange has now spread over all the warmer regions of the earth. It has an astonishing productiveness. Oranges are evergreen, and bear simultaneously fruit and blossoms. The leaves are fragrant, and have a limited use in medicine in cases of hysteria, where they are employed instead of tea. Oil of neroli is prepared from orange flowers, and is the basis of eau de cologne. The fruit contains citric acid, but not in so large proportion as the lemon. The rind enters into various articles of confectionery, and is used for flavoring. Sicily, Malta, Spain, the Azores, Portugal, and Cuba have furnished most of the oranges of commerce, but Florida and California are now strong competitors.

Orange Free State, province of the Union of South Africa; bounded N. by the Transvaal, E. by Natal and Basutoland, S. by Cape Colony, W. by Bechuanaland; area, 50,392 sq. m.; pop. (1907) estimated at 447,008, of whom (1904) 142,679 were whites; capital, Bloemfontein; coal, diamonds, and salt are found; stock raising is an important industry. The colony, founded 1836 by Boers who withdrew from Cape Colony, was known as the Orange Free State till 1900, when, in consequence of its participation in the Boer attack on the adjacent British colonies, 1899, it was annexed to the British crown as the Orange River Colony. Responsible government has been established in the colony under letters patent dated June 5, 1907; the colony joined the Union of South Africa May 31, 1910.

Orangemen, members of a political association whose official name is THE LOYAL ORANGE INSTITUTION, formed, in opposition to the Roman Catholic association of the Ribbonmen, to defend the Protestant religion in Ireland, maintaining the legislative union between Great Britain and Ireland, and the Protestant succession to the throne. The term Orangemen, which came into use after the Revolution of 1688, meant originally the supporters of William III, Prince of Orange, against the deposed Stuarts and their Roman Catholic adherents; but the association was not formed till 1795, when the first Orange lodge was founded in Ireland. The association was dissolved, 1836, but, 1845, it was revived as a secret society.

Orange River Colony. See ORANGE FREE STATE.

Orang-Outang (ō-rāng'-ō-tāng'), Malayan, ORANG UTANG, large anthropoid ape (*Simia satyrus*) inhabiting many of the low districts of Borneo, and more rarely found in the E. portion of Sumatra. In bulk the adult male orang comes next to the gorilla, but, owing to the shortness of the legs, rarely attains a height of 4 ft. 6 in. The arms are very long, digits of the hands and feet much curved, thumb very small.

Orato'rians, members of monastic orders in the Roman Catholic Church. (1) A religious society ("Congregation of the Oratory") founded by St. Philip Neri, 1564; members live in community, and take no special vows; was chiefly confined to Italy till 1848, when two houses were established in England by John Henry Newman, in London and at Edgbaston near Birmingham. (2) An order founded in France, 1611, by the Abbé Bérulle, under the name of "Priests of the Oratory of Jesus"; aim was restoration of ecclesiastical discipline among the clergy; congregation became distinguished for its great number of eminent scholars; were deeply involved in the Jansenist controversy, and divided into Jansenist and Anti-Jansenist parties. After the outbreak of the French Revolution the congregation was dissolved. A new congregation was organized, 1852, known as the "Oratory of the Immaculate Conception."

Orato'rio, sacred musical composition, consisting of airs, recitatives, duets, trios, choruses, etc., with full orchestral accompaniment. The subject is generally taken from Scripture, and the text is sung and recited without dramatic action. The oratorio is a modified form of the mystery or religious tragedy of the Middle Ages. Its origin has generally been ascribed to St. Philip Neri, who, 1564, founded the Congregation of the Oratory in Rome, one of the objects of which was to render religious services attractive. In the present signification of the term, however, oratorios were not produced until about the middle of the seventeenth century. Among composers of oratorio may be mentioned Alessandro Scarlatti, Alessandro Stradella ("John the Baptist"), Giacomo Perti ("Abraham"), Benedetto Marcello

("Judith"), Heinrich Schütz ("Resurrection" and "Seven Words"), all of about the same period (1645-1710). Among oratorios the "Passion Music According to St. Matthew," by John Sebastian Bach, must be regarded as the greatest, most monumental work of its kind. Handel is the great master of oratorio. His best-known works were "Saul," "Messiah," "Samson," "Judas Maccabeus," "Jephthah," "The Creation," by Haydn, ranks next to "The Messiah" in popular repute. They have but one peer, Mendelssohn, whose "St. Paul" and "Elijah" are brilliant and beautiful examples. See CANTATA; OPERA.

Orbigny (ôr-bên-yê'), Alcide Dessalines d', 1802-57; French zoölogist and ethnologist; b. Couron; made extended explorations in S. America, 1826-33; Prof. of Paleontology in the Museum of Natural History, Paris, 1852-57; author of "Paleontology of France," "Travels in South America," etc., and, with his brother Charles, of "Dictionary of Natural History."

Orbil'ius Pupil'ius, Lucius, Roman grammarian; b. Beneventum; served at first as an attendant on the magistrates of his native place, then in the army in Macedonia; in his fiftieth year removed to Rome, in the consulship of Cicero, where he taught school for many years, and had among his pupils the poets Domitius Marsus and Horace, who recalls in his "Epistles" the severity of his master.

Or'bit, path in which a heavenly body moves. When there are but two bodies the revolution occurs in consequence of their mutual gravitation, combined with the original relative motion of the bodies. The orbit is then described in accordance with Keppler's laws, which are as follows: (1) Each body describes an ellipse in space, having the center of gravity of the two bodies as the center of motion, in one of its foci. If the motion of the lesser body is referred to the greater, taken as a point at rest, as is usual in astronomy, the lesser still describes an ellipse having the greater in one of its foci. (2) The velocity of each body in its orbit varies in such a way that the radius-vector, or line drawn from one body to the other, sweeps over equal areas in equal times. The velocity is therefore greater the nearer the two bodies come together. (3) The cube of the semimajor axis of the ellipse, divided by the square of the time of revolution, is proportional to the combined masses of the two bodies. Owing to the attraction of the other planets, each planet deviates from its regular elliptical orbit. Further, these orbits are slowly changing from century to century, and these changes, called secular variation, can be computed for hundreds of thousands of years past and to come.

Orcein (âr-sê-in), chief ingredient of the red and purple dyestuffs known under the name of archil; formed by the action of ammonia and oxygen on orcin. When ammonia is added to a solution of orcin, and the whole is exposed to the air, the liquid assumes a dark-red or purple tint by the absorption of oxygen. On

acidulating with acetic acid, a dark-red precipitate of orcein is obtained.

Orchestra (âr-kês-trä), place or structure occupied by performers on instruments in a theater, music hall, or other building fitted for concerts, oratorios, etc. In oratorios, cantatas, and other pieces with vocal parts a portion of the orchestra is also allotted to the choir. The term "orchestra," in modern use, often means the body of instrumental performers themselves, especially as distinguished from the choir or vocal department, in the execution of such works as are for voices and instruments.

Orchid (âr-kîd), any member of a family of perennial endogenous herbs, found all over the world except in very cold and very dry climates. In the cooler regions they are terrestrial, while in hot countries they are often air plants, growing on stones and trees, but epiphytic (i.e., merely attached to) rather than parasitic. They have irregular and often extremely beautiful, but sometimes very grotesque, flowers. Fertilization is almost always effected by insects. Many of the species have flowers singularly resembling insects in form. Many have very fragrant blossoms. This vast order affords a few useful plants, among which are vanilla, faham, salep, also several medicinal products. The U. S. has few species, although some, like the lady's slipper, are curious and beautiful.



ORCHID.

1. Complete flower.
2. Relation between pollen sacs and stigma surface.

Orchom'enus, old city of Greece, in Boeotia, at the entrance of the river Cephissus into the Lake Copais; capital of the prehistoric empire of the Minyae; reported by Homer to have sent thirty ships to the siege of Troy, and to have contained riches equal to those of Thebes. In the Persian wars it abandoned the national cause, and in the wars between the various Greek races it always sided with the aristocratic party; but, 367 B.C., was taken and destroyed by the Thebans. Rebuilt by the Phocians, it was again destroyed by the Thebans, 346, and, although Philip of Macedon once more rebuilt it, it never again acquired any importance. The site was excavated by Schliemann, 1880, 1881, and 1886.

Ord, Edward Otho Cresap, 1818-83; U. S. military officer; b. Cumberland, Md.; graduated

at West Point and assigned to the artillery, 1839; at outbreak of Civil War was stationed in California. Appointed brigadier general of volunteers, he fought the battle of Dranesville, December 20, 1861; and as major general of volunteers, commanded the left wing of Grant's army in Mississippi, August–September, 1862; commanded the Thirteenth Army Corps during the siege and capture of Vicksburg and capture of Jackson; Eighth Corps and Middle Department, July 11–21, 1864; and the Eighteenth Corps before Richmond, July 21st–September 29th. On January 18, 1865, he relieved Butler in command of the Department of Virginia and N. Carolina and of the Army of the James, and commanded a corps in the final assault on Petersburg. On December 6, 1880, he was by special act of Congress placed on the retired list with rank of major general, U. S. A.

Ordeal (ôr'dě-ăl), ancient form of trial for persons accused of crime, designed to determine their guilt or innocence by a supposed reference to the judgment of God. The earliest mention of such a practice is in the laws of Moses (Num. v), and trial by ordeal seems to have been known in Greece. During the Middle Ages trials by fire and by water were most usual. "Fire ordeal," says Blackstone, "was performed either by taking up in the hand, unhurt, a piece of red-hot iron, or else by walking barefoot and blindfold over nine red-hot plowshares, laid lengthwise at unequal distances; and if the party escaped being hurt, he was adjudged innocent; but if it happened otherwise, as without collusion it generally did, he was then condemned as guilty." The trial by water was of two kinds, that by boiling water and that by cold water. In the former, the individual thrust into a vessel of hot water his arm, which when withdrawn was bound up and sealed, and at the end of three days examined; if no trace of scald appeared, he was declared innocent. In the cold-water ordeal the individual was thrown into the water, and if he floated without swimming he was considered guilty, but if he sank he was deemed innocent and drawn out. There were many other forms of ordeal, and among them the ordeal of battle. In the early periods many of the forms of ordeal were sanctioned by the councils of the Church. From the sixth century down they were generally condemned by the popes. In England by the sixteenth century the practice, with a few exceptions, had been given up.

Order, name used by zoölogists and botanists for combinations of animals and plants. In zoölogy it is now always used for a group comprising one or more families and intervening between the family and the class. In botany the term has generally been used much as family is used in zoölogy—that is, to denote a group above the rank of a genus; but in the botanical articles in this cyclopedia the usage agrees with that in zoölogy. Order also originally designated organized bodies of men vowed to monastic rule as well as military life, especially for war against the Saracens and Moors; secondly, select bodies of knights and nobles having a peculiar title and a badge

to testify to it; thirdly, modern organizations, supposed to be confined to those who have shown especial merit, and more often consisting partly of these and partly of men occupying high official positions; also the decorations or badges indicating membership in such organizations. Perhaps 300 orders have existed in Europe since the tenth century. Among them are the Order of St. John of Jerusalem; the Templars, or Knights of the Temple, a similar order; and the Teutonic Order (now Austrian), which exists in a modified condition. Among ancient honorary orders are the Order of the Garter (see **GARTER**, **ORDER OF THE**), the Order of the Elephant of Denmark, the Golden Fleece, and the Order of the Thistle, founded by James II of England. The Black Eagle of Prussia, though not founded until 1701, is purely aristocratic and limited to thirty persons besides foreign princes.

The most celebrated of modern orders is the Legion of Honor, founded by Bonaparte. The English Order of the Bath is similar, though more rarely given; it consists of 75 Knights Grand Cross, who may put G. C. B. after their names, 200 or 300 knights commanders (K. C. B.), and about 700 "Companions of the Bath" (C. B.). The Order of the Star of India and that of St. Michael and St. George are British orders provided for distinction in the colonial service and in India. Every nation of Europe has such distinctions for military merit in the first place, and then for success as artist, author, engineer, or the like. All the orders have their "crosses" or "jewels," and their ribbons of special colors; and for the higher grades plaques or stars, which are worn on the breast. In the U. S. there are no national orders, but Congress has provided a special medal of honor to be awarded for gallantry in action.

Order of Our La'dy of Mer'cy. See **MERCY**, **SISTERS OF**.

Order of Our Lady of Mt. Car'mel. See **CARMELITES**.

Orders in Coun'cil, term applied to orders made by the sovereign of Great Britain by advice of the Privy Council. Strictly these can be made only in the exercise of executive authority, and an order in its nature legislative would be unconstitutional as encroaching on the authority of Parliament.

Orders, Reli'gious. See **MONACHISM**.

Ordinance of 1787, in U. S. history, a law passed by Congress in 1787, legislating for the whole of the Northwest Territory, including what afterwards constituted Ohio, Indiana, Illinois, Michigan, and Wisconsin. It prohibited slavery and involuntary servitude in this territory except in punishment of crime. The navigable waters leading into the Mississippi and St. Lawrence were made common highways. A declaration in favor of education was made and has been followed in the states carved out of this territory. The antislavery clause was of tremendous importance, for had slavery extended into the new territory the U. S. would have become a slave republic.

Ordinary (Roman law, *iudex ordinarius*), in its proper sense, and in that of the ecclesiastical law, a judge who took cognizance of causes in the regular course and right of his office, and not by way of special deputation. In England the bishop of each diocese is the ordinary therein. As such he certifies excommunications, the lawfulness of marriages, and the like ecclesiastical and spiritual matters, to the courts of common law. Formerly the bishops' or archbishops' courts possessed probate jurisdiction, but this was taken from the ordinary by statute, 1857 and 1858.

Ordinate, the distance of the point from the axis of abscissas, measured on a line parallel to the axis of ordinates. Every function of a single variable may be regarded as the ordinate of a point of a curve of which the variable is the corresponding abscissa. This curve is called the curve of the function.

Ordination, act of conferring holy orders, or of initiating a person into the ministry of religion, or setting him apart for performing ecclesiastical rites and duties. The Roman Catholic, the Eastern, and the Anglican churches agree in maintaining that ordination is a prerogative of the bishops. They consequently deny the validity of the orders, and even the legitimate existence, of a church which has no bishop. The Presbyterian churches hold that bishops and presbyters are in Scripture identical. The views of the other Protestant bodies are not essentially different. The Roman Catholic and the Eastern churches regard ordination as one of the seven sacraments, in which supernatural grace is conferred. The Protestant churches hold that it is only a rite for setting apart a minister for his ecclesiastical duties.

Ordinance, term originating in an *ordinance* promulgated in reign of Henry VIII of England, regulating the caliber, figure, and dimensions of cannon. Prior to this, artillery, as well as arms of all kinds, had been fashioned according to the fancy of each maker, and the object and effect of the ordinance was to establish uniformity. Arms made in conformity to the specifications of the board were termed *ordinance* or *ordnance*, in contradistinction to those of irregular pattern; and from this sprang the custom of designating all artillery as ordnance. In addition to cannon, the U. S., following the English custom, has extended the term ordnance to include all firearms of every description, whether cannon or small arms. The term *ordnance stores* comprehends ammunition, all carriages used for artillery purposes and their equipments, and all other apparatus and machines required for the service and maneuvers of artillery, together with the materials for their construction, preservation, and repair; also all side arms and accouterments for artillery, cavalry, and infantry, together with utensils and stores for laboratories. See **ARTILLERY**; **MACHINE AND RAPID-FIRE GUNS**.

Ordinance Department, branch of the U. S. War Department, vested with the duties of providing, preserving, distributing, and accounting for every description of artillery, small arms,

and all the munitions of war. In these duties are comprised that of determining the general principles of construction and of prescribing in detail the models and forms of military weapons. They comprise also the duty of prescribing the regulations for the proof and inspection of these weapons, for maintaining uniformity and economy in their fabrication, for insuring their good quality, and for their preservation and distribution.

Ordnance Survey, department of the British Govt.; under control of the Board of Ordnance up to 1870, and afterwards under that of Agriculture and Fisheries; has charge of the preparation of maps and plans of the United Kingdom. The survey is organized on a military basis, and members are always held in readiness to carry out such surveys as may be needed on active service. Maps of the whole of Great Britain have been published on the scales of 25 in. to the mile for cultivated districts, 6 in. and 1 in., and of Ireland on the 6 in. and 1 in. scales. A revision of the survey of Great Britain and a resurvey of Ireland on the 25 in. scale were in progress, 1907.

Ore and Ore Deposit. An ore is a metal chemically combined, or in a native state, mechanically mixed with other substances, which render treatment necessary to separate it. In a technical sense, only those substances are ores which contain the metal in sufficient quantity and of sufficient purity to make the treatment profitable. They are found in ore deposits which are natural occurrences of metalliferous minerals. Such deposits of ore are generally mixed with other minerals called the gangue. In texture the deposit may be compact, granular, micaceous (in thin scales), disseminated (distributed through the gangue in grains or scales), porphyritic (distributed as integral crystals), banded or combed, brecciated (containing fragments of the inclosing rock or country), and drusy (containing cavities lined with crystals). The boundaries of a deposit are called walls and, if well defined, the selvage.

The formation of any deposit was due to slowly acting causes working during long periods and often under varying conditions. The progress of growth is often marked by a banded structure, the varying conditions by the alternating constitution of the bands, and the relative ages of the constituents by their relative positions forming a "paragenetic series." Certain metals tend to occur together, as ores of lead and zinc, of copper and iron, cobalt and nickel.

When the country rock has been torn asunder, the deposit filling the space is a "fissure vein." The extension of a vein horizontally is called its strike, direction, course, or bearing, and is expressed in points of the compass, as NE. by N., or in degrees of the quadrant, as N. 33° 45' E. Its vertical angle with the horizon is called the dip. Veins often split up. Complications are brought about by "faults" —dislocation of strata.

Sometimes the ore is concentrated at different points into bodies called bonanzas, nests, chimneys, pockets, masses, etc., while the rest of the vein is barren or contains only dissem-

inated ores of the same kind or of different kinds to that of the bonanzas. When a rock mass is eroded or broken up the heavy ore may remain behind as a surface deposit. Iron Mountain in Missouri was thus mantled with from 2 to 20 ft. of loose iron ore. Much gold, platinum, and tin has been so deposited, especially in the beds of streams. See GRINDING AND CRUSHING MACHINERY.

Oregon (named from the Oregon River, now the Columbia), state flower, Oregon grape; state in the W. division of the American union; bounded N. by Washington, E. by Idaho, S. by California, W. by the Pacific; length E. to W., about 360 m.; breadth, 290 m.; area, 96,690 sq. m.; pop. (1910 census) 672,765; principal cities and towns: Portland (capital), Astoria, Baker, Pendleton, Salem, The Dalles, Oregon,



Eugene, Albany, La Grande, Ashland, Grant's Pass, Corvallis, Medford, Roseburg, McMinnville, Marshfield. Three ranges of mountains divide the state from N. to S., the Coast Range, 10 to 30 m. from the ocean; the Cascade Mountains, 110 to 150 m. inland; and the Blue Mountains, near the E. boundary. The Cascades and Coast Range are united by four lateral ranges—the Callapoia, Umpqua, Rogue River, and Siskiyou Mountains. The Coast Range has an extreme altitude of 4,000 ft., and is covered to its summit with dense forests. The Cascade Mountains are a continuation of the Sierra Nevada Mountains; extreme general height, 7,000 ft., with a number of peaks rising from 2,000 to 5,000 ft. higher. The most noted are Mt. Hood, 11,500 ft.; McLaughlin or Pitt, 11,000; Jefferson, 10,500; and Three Sisters, 9,500. The Cascades are densely timbered to the snow line. The Blue Mountains have an extreme height of about 3,000 ft.

The largest of the many fertile valleys is the Willamette, between the Coast Range and Cascade Mountains, and the Columbia River and the Callapoia spur; 150 m. long and from 30 to 70 m. wide. S. of it, between the lateral ranges, are the Umpqua and Rogue River valleys. The region E. of the Cascade Mountains, embracing two thirds of the state's area, is known as E. Oregon. There are fertile valleys along the water courses and in the vicinity of the numerous lakes in the S. part, while at the N. extremity near the base of the Blue Moun-

tains the land is rolling and extremely fertile. In the Blue Mountains, and between it and the Snake River, are numerous fertile valleys. The rivers flowing into the ocean include the Umpqua and Rogue; flowing into the Columbia, the Lewis and Clarke, Willamette, Deschutes, John Day, and Umatilla; flowing into Snake River, itself a branch of the Columbia, Grand Ronde, Powder, Burnt, Malheur, and Owyhee. The large lakes, some of them saline, are the Klamath, Upper and Lower, Goose, Warner, Salt, Christmas, Albert, Summer, Silver, Harney, and Malheur. Crater Lake lies in the Cascades, 8,000 ft. above sea level. The chief harbor is the Columbia River, which at its entrance has 28 ft. at extreme low tide. Minor harbors are Tillamook Bay, Yaquina Bay, Alsea River, Siuslaw River, Coos Bay, Coquille River, Rogue River, and Port Orford. Seasons throughout the state characterized as the wet and dry; dry season usually May 1st to October 15th; temperature in E. Oregon, 90° in summer to 10° in winter, with occasional summer rise to 100° and a winter fall to 0°; summer dryer and winter colder than in W. Oregon; rainfall averages about 20 in.; average spring temperature of W. Oregon, 52°; summer, 67°; autumn, 53°; winter, 39°; average rainfall in Willamette Valley, 44 in.; mean average temperature S. Oregon, July, 68°; January, 45°; average rainfall, 22 in.

The soil is volcanic in origin; valleys alluvial; entire region W. of the Cascades and the N. portion E. of them have ample rainfall for crops. Large areas of the central and SE. portion depend largely on irrigation in farming; chief product, wheat. Apples, plums, prunes, grapes, and in the SW. peaches and figs, raised abundantly. The wool-growing industry is very large. Production of principal crops (1911), wheat, 16,726,000 bu.; oats, barley, rye, flaxseed, potatoes, and hay; value of crops, 1909, \$38,433,000; live stock, 1910, \$59,461,828. In 1911 the wool clip yielded 4,743,000 lb. of scoured wool, valued at \$2,466,360. Mineral products include gold, both placer and quartz, silver, copper, lead, cinnabar, nickel, iron ore, coal, clays of several kinds, granite, marble, sandstone, limestone, quicksilver, platinum, salt, chalcidony, agate, carnelian, jasper; value of products (1910), \$3,738,806. Chief manufacturing industries, the canning of salmon and other fish, which abound in the rivers; lumber sawing, milling and reduction of ores, slaughtering and meat packing, shipbuilding and the production of railroad cars, wagons, furniture, flour, leather, boots and shoes, liquors, woolen goods, oils; "factory-system" plants (1909), 2,246; capital employed, \$89,082,000; value of products, \$93,005,000. Customs districts and ports of delivery, Astoria, Coos Bay, Portland; value of imports, domestic and foreign merchandise, for year ending June 30, 1911, \$2,728,816; exports, \$10,240,028.

Among early visitors to the coast of Oregon were the Spaniard Ferrello, 1543; Sir Francis Drake, the English freebooter, 1578; and the Spaniard Heceta, 1775, when the mouth of the Columbia was first observed. Capt. Robert Gray, a trader from Boston in the ship *Columbia*, entered the mouth of the Columbia, May

11, 1792, and laid the foundation of the American title to Oregon. The U. S. purchased Louisiana 1803, and acquired all the French title W. of the Missouri River, and, 1819, secured the entire Spanish title N. of lat. 42° by the Florida purchase. Nathan Winship, from New England, entered the Columbia, 1810, and built a trading post at Oak Point, 40 m. inland, the first settlement in Oregon, but abandoned it in a few weeks. Astoria was founded by the Pacific Fur Company, March 22, 1811, and named after John Jacob Astor. It was captured by the British and named Fort George, December 12, 1813; restored to U. S. jurisdiction, October, 1818. In 1818 the U. S. and Great Britain made a treaty of joint occupation of Oregon, which was terminated, 1846, by a treaty confirming the title of the U. S. The Hudson Bay Company was in practical possession after 1813, until enough citizens of the U. S. arrived to create a provisional government, 1843. Oregon was made a territory, August 12, 1848; admitted to the Union as a state, February 14, 1859. There were Indian wars, 1849, 1851, 1852, 1853-56, 1866-67, 1872-73, 1877, and 1878.

Oregon Riv'er. See COLUMBIA.

O'Reilly (ô-rî'll), John Boyle, 1844-90; American journalist and poet; b. Dowth Castle, Meath, Ireland; at age of eighteen enlisted in the British army, where he acted as a secret agent of the Fenian Society; was convicted of high treason, 1866, and sent to Australia under a twenty-years' sentence, but escaped and settled in the U. S., 1869; editor of the *Boston Pilot* from 1870 till death; writings include "Songs, Legends, and Ballads," "Moondyne," "Statues in the Block," "In Bohemia," "Stories and Sketches."

O'Rell', Max. See BLOUET, PAUL.

Orellana (ô-räl-yä'nä), Francisco de, abt. 1490-1550; Spanish explorer; b. Truxillo; joined the Pizarros in Peru abt. 1535; founded Guayaquil, 1537; was lieutenant of Gonzalo Pizarro in his expedition to the "Land of Cinamon," about the headwaters of the Coca and Napo, 1541. Crossing the Andes from Quito, the expedition reached the Coca and descended that river to its junction with the Napo. Orellana and fifty men were sent ahead to get provisions, but continued down the Napo to the Amazon, of which he was the first explorer, and reached the sea after a voyage of eight months. In the course of their journey the Spaniards heard of a tribe of female warriors or Amazons, hence the name of the river. Orellana returned to Spain and, 1544, received a grant to conquer and govern the regions he had passed through. He sailed, 1545 or 1549, and ascended the Amazon a short distance, then abandoned the enterprise, and died soon after.

Ores'tes, in Grecian mythology, a son of Agamemnon and Clytemnestra; avenged the murder of his father by killing his mother and her paramour, Ægisthus, but was immediately attacked by the Erinyes, who drove him mad, pursuing him from place to place. He sought

refuge with Apollo in Delphi, but the manner in which the Erinyes were finally appeased is variously related by the Attic tragedians, who frequently treated this myth and developed it differently.

Or'fa, Orfah, or Urfah (ôr'fä), city in Asiatic Turkey; in vilayet of Aleppo; about 40 m. E. of the Euphrates. The Jews identify it with Ur of the Chaldees. The Arabs associate it with Abraham, calling their chief sanctuary in the city the Mosque of Abraham, while the pond containing the sacred fish is the Pool of Abraham. As Edessa it was important in the crusades. The river Kara Kuzu, spanned by three bridges, flows through it. As the central station on the great route between Aleppo and Diarbekir, its transit trade is extensive. Pop. abt. 30,000, nearly a quarter of whom are Christians and Jews.

Or'ford, Earls of. See WALPOLE.

Or'gan, name applied to several musical instruments allied in construction and principle, but more distinctly to the church and concert-hall organ, a wind instrument having many pipes of different lengths and sizes, from which sounds are produced by the admission of compressed air conveyed to them from a bellows. The earliest trustworthy account of an organ is that of the one sent by the Greek emperor Constantine Copronymus to Pepin, King of the Franks, 755. Organs were common in England before the tenth century, but they were very rude in construction and of limited capacity. In the twelfth century their compass did not exceed twelve or fifteen tones. About this time semitones were introduced at Venice. Pedals, or foot keys, were added by Bernhard, a German, 1470; and in the same century the instrument reached substantially its present form. The organ is divided interiorly into four parts, the great, the choir, the swell, and the pedal organ. Some instruments have a fifth or solo organ, and some others a sixth or echo.

The structural portions of an organ are: (1) the apparatus for collecting and distributing the wind; (2) the mechanism controlling the keys and stops; and (3) the pipes. By means of bellows air is forced into a closed chest or reservoir. The air, unable to return by the way it came, can only find vent above through its upper floor, called the sounding board. The air is admitted to the pipes by the action of slides and valves which are set in motion by drawing out the registers and by pressing down the keys or pedals. The drawing out of a slide partly opens up to the air a whole set of pipes of one peculiar quality or tone, so that when any of the keys is pressed down the air finds its way into the appropriate pipe of this particular series. The shorter the pipe the more rapid the series of vibrations, and the higher the pitch of the note produced.

Metal pipes are made of tin, "metal" (a mixture of tin and lead), zinc, etc., while wooden pipes are generally of cedar, deal, or pine. The shape of pipes also varies.

In organ music, directions are often given for the use of 4-ft., 8-ft., or 16-ft. stops. The

meaning is this: the lowest note on the keyboard (C C) is assumed as the standard for such designations. Now, to produce the sound C C, an open pipe 8 ft. long is required; its octave above will be given by a pipe 4 ft. long; the double octave, 2 ft., and so on; and for the intermediate notes the pipes are properly graduated in length. A set of pipes of this description is therefore called "an 8-ft. stop" (as the *open diapason*, *dulciana*, *trumpet*, and several others). Such stops give the ordinary, standard, or concert *pitch*. If another range of pipes be added, sounding an octave lower, they will be of double length, and it will be called "a 16-ft. stop" (as the *double diapason*, or *bourdon*). On the other hand, the *principal* is an octave higher than the open diapason; consequently, its pipes are only half as long, and it is called "a 4-ft. stop." The *fifteenth*, in like manner, being tuned an octave above the principal, is "a 2-ft. stop," its lowest pipe being that of length. In a large organ there are many stops belonging to each of these classes, the largest pipe of a 32-ft. stop sounding C C C C. In the barrel or hand organ, a bellows within the instrument is worked by turning a winch, while by the same action, by means of an endless screw, a cylinder or drum is turned, on which the tunes are set in brass pins and staples, at such distances as required by the lengths and succession of the notes, as in the pins studding the cylinder of a musical box. The pins raise keys, which press down stickers, and open pallets or valves, admitting air to the pipes required. The concert organ in the Chicago Auditorium is one of the largest in the world.

Organ'ic Chem'istry, term that came into use formerly to express that branch of chemistry which dealt with the substances that occur in living things. A distinction was then made between these constituents of animate things and the mineral substances, the constituents of the inanimate portions of the earth. That branch of chemistry which had to do with the latter was called inorganic chemistry. As investigation advanced it was found that there is no essential difference between the compounds treated of in the two branches. They are all chemical compounds; and many of the substances found in plants and animals can be made artificially in the laboratory without the intervention of the life process. That which chiefly characterizes organic compounds is the fact that they all contain carbon, and therefore the term chemistry of the compounds of carbon has been generally adopted in place of organic chemistry.

Or'gan Moun'tains. See BRAZIL.

Orget'orix, Helvetian of noble birth, who instigated the migration of the Helvetii, described by Cæsar in the first book of his "Gallic War."

O'riel, **Bow**, or **Bay Win'dow**, window which projects from the side of a house; has three glazed sides, and is often divided by mullions. Some writers discriminate between the oriel window, carried on corbels and projecting from an upper story, and the bay window resting on the ground.

Oriflamme (ôr-flâm), banner of the Capetian kings of France; originally that of the abbey of St. Denis. Louis VI raised it for the first time, 1124, and it was disused after the defeat of Agincourt, 1415. It was of red or flame-colored silk, with two notches at its end, adorned with green silk tassels, and hanging from a gilded shaft.

Origen (surnamed ADAMANTIOS, from his untiring energy), 185-254; Christian Father; b. Alexandria; early became a Christian; opened a school in which at first he taught the Greek language and literature, but soon also began to expound the doctrines of Christianity. Bishop Demetrius appointed him master of the famous Catechetical School of Alexandria. In 228 he was called to Greece to dispute some heresy which had arisen there; on the way visited Palestine, and at Cæsarea was ordained a presbyter. This ordination Demetrius refused to recognize, partly because it was not given by himself as Origen's proper diocesan bishop. Two synods held in Alexandria supported the bishop, and the second condemned several of Origen's ideas as heretical, and xcommunicated him, 231. The bishops of Palestine, Phœnicia, Achaia, and Arabia declared for him, and he found refuge in Cæsarea, where he reopened his school. During the persecutions under Maximinius he fled to Cappadocia. Under Gordianus he returned, but the sufferings and torture experienced during the Decian persecution broke his strength. He died at Tyre. His chief works are "of the Principles," "Against Celsus," an apology for Christianity; the "Hexapla," an edition of the Old Testament in six parallel columns, and a treatise on martyrdom. He taught restorationism.

Original Sin, in theology, that act or state of sin from which all other sins originate. It is distinguished into *original sin imputed*—e.g., the guilt of Adam's apostasy charged to his descendants—and *original sin inherent*—that innate subjective moral corruption which is inherited by all men at birth, and which is the immanent cause of all actual transgression.

Or'igin of Spe'cies. See EVOLUTION.

Orino'co, river of Venezuela, but with branches in Columbia, which falls into the Atlantic by numerous mouths between lat. 8° 40' and 10° N., after a course of about 1,500 m. It rises in the Sierra de Parima, close to the frontier of Brazil, and has a devious N. course, receiving the Ventuario on the right and the Guaviare and Meta on the left, to its confluence with the Apure, lat. 7° 30', lon. 66° 45', whence it flows nearly E., its principal tributaries in this part being the Caura and Caroni, both on the right bank. Below its junction with the Ventuario and Guaviare, it passes through the region of the raudales, or rapids. About 130 m. from the sea it forms a delta, by sending to the N. a branch divided into several streams called the Bocas Chicas. The main stream, called the Boca de Navios, is divided for about 40 m. by a line of islands, leaving a channel about 2 m. wide on each side. At the great mouth of the river the breadth is upward of

60 m., but a sand bar extends across the navigable channel in the middle, with but 15 ft. of water. Several of the other mouths are navigable, and the main stream may be ascended for about half its length. At Angostura, or Ciudad Bolívar, the head of tide water, 270 m. from the sea, it is 4 m. wide and 390 ft. deep. The region drained by the Orinoco, comprising an area of nearly 400,000 sq. m., is entirely occupied by immense plains, rising in some parts 1,300 ft., but in many places little above the level of the sea. The river rises from April to October, attaining the greatest height in July and August. The plains are at this season to a great extent overflowed. There are two remarkable rapids, called the Maypures or Apures and the Atures, the one in lat. 5° 8' N., about 80 m. below the junction of the Guaviare, the other about 36 m. lower down. The Orinoco near its source is connected with the Rio Negro, an affluent of the Amazon, by the Cassiquiare. It is navigable for 870 m. to the rapids, and above them to within 150 m. of its source.

O'riole, name properly belonging to brightly-colored Old World birds of the genus *Oriolus* and the family *Oriolidae*; but in the U. S. the name is given to birds of the family *Icteridae*. The name was probably transferred to these birds of the New World on account of their



EUROPEAN GOLDEN ORIOLE.

color, which is usually black and yellow, like that of the true orioles. (See BALTIMORE ORIOLE.) The only European oriole is the *O. galbula*, or golden oriole. The bird has a very peculiar note, loud, flutelike, and so singularly articulate that the Italian peasantry believe it speaks their language. It generally associates in little flocks, and is of great service in clearing away fruit-eating insects.

Orion (ō-rī'ōn). Greek mythical hero, son of Hyricus, of Hyria, Bœotia, called by the Bœotians Candaon. He fell in love with Æro, or Merope, the daughter of Cœnion of Chios, and to please her cleared the island of wild beasts. Once when intoxicated he forced his way into Merope's chamber, and the father with the aid of Bacchus and the satyrs put out his eyes. He recovered his sight by exposing his eyeballs to the rising sun, and went into Crete, where he lived as a hunter with

Diana. After his death he was placed among the stars, where he appears with a girdle, sword, lion's skin, and club, the brightest constellation in the N. heavens. The constellation is represented by the figure of a man with a sword by his side. Though a S. constellation with regard to the ecliptic, the plane of the equator passes through its middle. It contains seven conspicuous stars; the three forming the belt are also called "Jacob's staff" and the "yard wand." One of the most remarkable nebulae of the heavens is situated in the sword handle of Orion.

Orizaba (ō-rē-thā'bā), town of Vera Cruz, Mexico; 17 m. SE. of the mountain to which it has given its name. Its delightful climate and magnificent scenery make it a favorite resort both for Mexicans and for foreigners. The town has several cotton mills and other manufactories, the motive power being derived from the Rio Blanco. Orizaba was an ancient Indian town. Pop. (1900) 32,894. The mountain, also called Citlaltepētli, "Mountain of the Star," by the Aztecs, is near the E. edge of the plateau. The summit is covered with snow. The highest point is 18,314 ft. above sea level; it is therefore the highest mountain in Mexico. In clear weather it is visible from the Gulf of Mexico, near Vera Cruz.

Orkhan (ōr-khān'), Ghazi, "the Victorious," 1290-1360; first Ottoman sultan, 1326-60; captured Broussa, 1326, shortly before his father's death, and, as his elder brother Alaeddin refused the throne, he succeeded to it. Orkhan captured Nice, Nicomedia, and Pergamus, and by these and other conquests more than trebled his states, which Alaeddin organized. By the conquest of Tzümpe and Gallipoli, 1357, the Ottomans gained their first foothold in Europe. Orkhan married, 1347, Theodora, daughter of John VI Cantacuzenos, Byzantine emperor, but did not force her to adopt his creed.

Ork'ney Islands, group of sixty-seven islands, of which twenty-nine are inhabited, lying off the N. coast of Scotland, from which they are separated by the Pentland Firth; area, 376 sq. m.; pop. (1901) 28,699; largest is Pomona, or the Mainland; most remarkable among others are S. Ronaldshay, Hoy, Flotta, Rousay, and Sanda; excepting the Hoy, rocky and mountainous, the islands are low; climate mild, considering the latitude; soil remarkably fertile. They are mentioned by Pliny, Ptolemy, and other classical writers, under the name Orcades; together with the Hebrides were conquered by the Norwegians, 876; annexed to Norway, 1098; united with Denmark, 1397; and, 1468, the Danish king, Christian I, gave them to the Scottish king, James III, who married his daughter, as a security for her dowry. The dowry was never paid, and, 1590, the islands were turned over to Scotland.

Orléanais (ōr-lā-ān-nā'), ancient province of France, near the center of the country, originally inhabited by the Carnutes and Senones; capital was Orleans; now divided into the departments of Loir-et-Cher, Eure-et-Loir, and Loiret.

Orleans (ôr-lâ-ân'), **Louis Philippe Joseph**, (Duc de), better known as **Philippe Egalité**, 1747-93; French revolutionist; b. St. Cloud; entered with zeal into the revolutionary agitation; renounced his rank and titles, assuming the name of **Citizen Egalité**, and aspired to be the leader of the republican movement. Influenced by fear he voted for the death of the king, but neither this nor his subserviency as the tool of the Jacobins saved him from the suspicion of complicity with his kinsmen, and he was guillotined.

Orleans, Louis Philippe Robert de, 1869- ; French prince; b. Twickenham, England; eldest son of Comte de Paris; on attaining majority went to Paris and claimed his right to enter army, but was imprisoned, then banished under expulsion act; became head of house on death of father, 1894; removed to Brussels. In 1905 he organized and led a N. polar exploring expedition.

Orleans, Philippe (Duc de), 1674-1723; regent of France; distinguished himself as a soldier, especially while in command of the French army in Spain; became regent on death of Louis XIV, and showed himself an able ruler. The Stuarts left France, and an alliance was formed with Great Britain; on the other hand, his government countenanced the financial folly of the Mississippi scheme; in private life was grossly licentious, and excesses hastened death.

Orleans, Maid of. See **JOAN OF ARC**.

Orleans', capital of department of Loiret, France; on the Loire, crossed here by a magnificent bridge of nine arches; 75 m. SSW. of Paris; has a cathedral which is one of the most magnificent Gothic edifices of France; educational institutions, especially its medical schools and museums, are excellent, and sugar refineries and manufactures of vinegar and woolen fabrics are very extensive. The city contains three beautiful statues of Joan of Arc, the Maid of Orleans. During the Franco-German War, Orleans for some time, 1870, was occupied by the Germans. Pop. (1906) 68,614.

Orleans, Duch'y of, old division of France, consisting of Orléanais proper, with the capital, Orleans; formed a countyship under the Carolingian and Capetian dynasties; was erected into a duchy, 1344, by Philip VI of the house of Valois, and given to his son as an appanage; later was held in same way by different younger branches of the reigning families of Valois and Bourbon.

Orloff, Alexis, 1736-1808; Russian naval officer; brother of Gregory; was of gigantic stature, but little intellect. Joining his brother's conspiracy, he is said to have strangled Peter III with his own hands. He commanded the squadron which won the great battle of Tchessme, 1770; whence he received the title of Tchessmenski, but the victory was due to his British officers. He was banished soon after the accession of Emperor Paul. **GREGORY**, 1732-83; Russian military officer; chief of the conspirators who deposed Peter III, 1762, and

made Catharine II sole ruler; for this was made a count. By him Catharine had a son, Count Bobrinski. His brutality and arrogance finally alienated the empress; he was banished, then recalled, and on account of his courage during the pest at Moscow, partially restored to favor. Failing in a diplomatic mission, and again disgraced, he became insane.

Orloff, Alexis (Prince), 1786-1861; Russian diplomat; one of the four illegitimate sons of Gen. Feodor Orloff, from whom the present members of the family descend; saved the life of Emperor Nicholas, 1825; negotiated the Treaty of Adrianople, 1829, and Treaty of Hounkiar Iskelessi, 1833; represented Russia at the Congress of Paris, 1856, and was made a prince.

Or'mazd, Ormuzd, or Ahura Mazdah (â-hô'râ máz'dâ), supreme god in the religion of ancient Persia. The meaning of the name Ahura Mazdah is the Lord Wisdom, and he is the omniscient, omnipresent source of all that is good in the world; his opponent, **Ahriman** (Anra Mainyu, the Enemy Spirit), affords a parallel to Satan. Zoroastrian dualism recognizes the two principles of Ormazd and Ahriman as primeval and coeval, but not coeternal: Ormazd in the end shall triumph and destroy Ahriman. The exalted and spiritual conception of Ahura Mazda with his ministering angels that is found in the Zoroastrian Scriptures is the nearest approach to Jehovah that can be found in ancient religions.

Ormolu', or Moss'ic Gold, alloy of zinc and copper, containing from 25 to 75 parts of zinc in 100 of the alloy; the fused mass is kept until it takes on a white color, when it is cast at once, for if remelted it becomes a comparatively worthless kind of brass; is employed in making household ornaments, which are colored by pickling in dilute oil of vitriol and then washed and varnished.

Or'mond, James Butler (first Duke of), 1610-88; English soldier and statesman; b. London; succeeded to the earldom of Ormond on death of grandfather, 1632; commanded royal troops in Ireland during the insurrection of 1641; was forced to make a disadvantageous armistice with the rebels, 1643; became lord lieutenant, 1644; resigned his office to the parliamentary commissioners, and retired to France, 1647; proclaimed Charles II in Ireland, and made an unsuccessful attempt to capture Dublin, 1649; driven from Ireland by Cromwell, 1650; created duke by Charles II, 1660; Viceroy of Ireland, 1661-69; Chancellor of the Univ. of Oxford, 1669; again Viceroy of Ireland, 1677-85; made a duke in English peerage, 1682.

Or'muzd. See **ORMAZD**.

Ornithology. See **BIRDS; BIRDS' NESTS**.

Ornithorhynchidæ, one of the two families representing the order *Monotremata* and subclass *Ornithodelphia*, and including the duck-bill or "water mole" of Australia. The general form of the body is somewhat beaverlike;

the covering is a dense and soft fur. The family is peculiar to Australia, and is represented



ORNITHORHYNCHUS PARADOXUS.

by but a single genus containing but one certainly known species.

Oro'dus, genus of cestracient sharks of which remains are found in the carboniferous rocks. Some of the species must have been of immense size, as the teeth, of which the number was large, are occasionally found 4 to 5 in. broad and very massive.

Oron'tes (Arabian, NAHR-EL-ASI, "rebellious river"), principal river of Syria, 240 m. long, but not navigable; rises in the Anti-Lebanon, proceeds N. 200 m., then turning abruptly SW. flows close to Antioch (Antakia) through a picturesque country, and enters the Mediterranean 29 m. S. of Iscanderoon; was originally called Typhon from a mythical dragon who was said to have traced its course with his tail, but received its later name from Orontes, who built a bridge over it. Not far from its source is a peculiar square monument terminating in a pyramid about 65 ft. high. This monument is connected with the garden or hunting park mentioned by Strabo as being near the source.

Oro'sius, Paulus, Spanish theologian of the fourth and fifth centuries; was associated with St. Augustine in Africa and St. Jerome in Palestine in the controversy with Pelagius, and returned to Spain, 416. His "Historiarum adversus Paganos Libri VII," from the creation of the world to the year 417, was translated into Anglo-Saxon by King Alfred.

Orpheus (ôr'fê-ûs), mythical singer of Thrace, son of Apollo by the muse Calliope, and husband of the nymph Eurydice. The charm of his song and lyre playing was so great that even wild animals, trees, and rocks followed him. When Eurydice died of a snake's bite he descended to Hades to bring her back, and moved even Persephone to grant his request, conditionally. He was a member of the Argonautic expedition, and wrought various wonders in behalf of his comrades. He

was torn to pieces by Thracian bacchantes, either because he was opposed to their orgies, or because, after the death of Eurydice, he hated all women. His dismembered body was buried by the Muses of Pieria on Mt. Olympus, but his head and lyre floated across the sea to Methymna in Lesbos, the island of song. See EURYDICE.

Or'phic Broth'erhood, in ancient Greece, a society of ascetic persons who devoted themselves to a mystical worship of the Thracian Bacchus (Dionysus-Zagreus) and the elaboration of a system of theology, under the professed guidance of the spirit of Orpheus. They dressed in white, ate no animal food, avoided all excesses, and professed to aim at purity of life, an exalted religious experience, and an immortal existence after death.

Or'piment, or **King's Yel'low**, sulphide of arsenic, prepared artificially by precipitating a solution of arsenic with sulphureted hydrogen gas, or by fusing together equal parts of white arsenious acid and sulphur. It was formerly employed, in admixture with lime, as a depilatory, and in another dangerous way is used as an ingredient in fireworks.

Or'erry, machine constructed to exhibit the motions of the planets round the sun, or of satellites round their primary. Planetary machines constructed in accordance with the idea that the earth was the center of motion were very early in use. Such were the Chinese spheres, said to have been made some two thousand years before the Christian era, and later the spheres of Archimedes and Posidonius. The orrery made by Rowley, 1715, at the expense of Charles Boyle, Earl of Orrery, was a combination of the planetarium of the sixteenth century with other machines which showed the motions of the earth, moon, and planetary satellites.

Or'ris Root. See IRIS.

Orsay (ôr-sâ'), **Alfred Guillaume Gabriel** (Comte d'), 1801-62; French society leader; b. Paris; served in the army; married, 1827, a daughter of the Earl of Blessington by his first wife; separated from her, 1829; lived thenceforth chiefly in London, where he was regarded as a model of elegance and courtliness; was the most conspicuous member of the social circle at Gore House; was for many years a constant companion of Lady Blessington; distinguished for his handsome person, fascinating powers of conversation, and artistic skill; became director of fine arts at Paris under Louis Napoleon.

Orsini (ôr-sē'nē), Roman family of princely rank; belonged to the party of the Guelphs; became conspicuous in the history of Rome during the Middle Ages by its perpetual feuds with the family of the Colonnas, which belonged to the Ghibelline party. It spread very widely, acquired immense possessions, and its power culminated in the latter part of the thirteenth century, when one of its members became pope under the name of Nicholas III (1277-81). Another member of the family became pope under the name of Benedict XIII

(1724-30). The family seat is still at Rome, where the Orsini Palace stands on the spot where formerly stood the theater of Marcellus.

Orsini, Felice, 1819-58; Italian revolutionist; b. Meldola; after Revolution of 1848-49 went to England; was imprisoned at Mantua, 1854-56; escaped, and, returning to England, published "The Austrian Dungeons in Italy." He considered Napoleon III the main obstacle to the progress of revolution, and, 1857, went to Paris to plan his assassination, together with Pieri, Rudio, and Gomez. Three bombs were thrown under the imperial carriage as it approached the Grand Opéra on the evening of January 14, 1858, and exploded, killing or wounding many persons, but the emperor and empress escaped. The life of Rudio was spared, but Orsini and Pieri were executed, and Gomez was sentenced to hard labor for life.

Ortelius, Abraham, 1527-98; Belgian geographer; b. Antwerp; traveled extensively; made royal geographer by Philip II, 1575; widely known by his "Theatrum orbis terrarum," a collection of maps with short descriptions of the various countries in Latin. This was long a standard geographical authority in Europe, and there are various editions in Latin, French, and German. Several of the maps are of great interest for the early cartography of America.

Orthodoxy. See HERESY.

Orthography, art of conventionally correct spelling, or of writing words according to a conventional standard of usage. When a language is first reduced to writing its spelling is approximately phonetic, at least so far as the available alphabet will permit. In the early Greek inscriptions, for example, each of a score or more of local communities speaking diverse dialects has recorded its language in a rude phonetic spelling. The necessity for an orthography is dictated (1) by the existence of dialects within the domain covered by a literature, and (2) by the accumulation of books which give an historical continuity to a literature even over periods in which the spoken language has suffered change. The English orthography presents the most extreme illustration of divorcement of the written from the spoken form of language. The spelling forms no certain guide to the sound of a word. The word and not the letter is the unit. The appeal is to the eye, not the ear. In acquiring the written language one must practically learn each word by itself. The influence of printing tended to the gradual development of an orthographical uniformity which was practically established in its present existing form by the beginning of the eighteenth century. The appearance of dictionaries (Bailey's, 1721; Johnson's, 1755) and the use of spelling books in the schools further developed this sense for uniformity. English spelling is neither phonetic nor etymological, but merely conventional. Attempts to reform it in the interest of etymology, and especially in conformity to Greek and Latin forms, have been frequent since the revival of learning.

A Simplified Spelling Board, including the editors of the three chief English dictionaries

published in Great Britain and the editors of the three chief American dictionaries, organized in New York City, 1906, issued a preliminary list of 300 words, recommended for simpler spelling. Pres. Roosevelt directed the public printer to follow the new forms in all government publications, but later in the year rescinded the order. The list of simplified spellings suggested by the board was published with the following rules:

1. Words spelled with *ae*, *æ* or *e*. Rule: Choose *e*. Ex.: *Anæsthetic, æsthetic, mediæval*, etc.
2. Words spelled with *-dge*-ment or *-dg*-ment. Rule: Omit *e*. Ex.: *Abridgment, acknowledgment, judgment, lodgment*.
3. Words spelled with *-ed* or *-t*, the preceding single consonant being doubled before *-ed* (*-pped*, *-ssed*) and left single before *-t* (*-pt*, *-st*). Rule: Choose *-t* in all cases. Ex.: *Dript, dript, dropt, dript, dropt, dropt, bleat, preat, diatrest, mist*, etc.; *bushit, hushit, washit*, etc.
4. Words spelled with *-ence* or *-ense* (Latin *-ens-a*). Rule: Choose *-ense*. Ex.: *Defense, offense, pretense*.
5. Words spelled with *-ette* or *-et*. Rule: Omit *-te*. Ex.: *Coquet, epaulet, etiquette, omelet*, etc.
6. Words spelled with *gh* or *f*. Rule: Choose *f*. Ex.: *Draft*.
7. Words spelled with *-gh* or without. (1) *-ough* or *-ow*. Rule: Choose *-ow*. Ex.: *Plow*. (2) *-ough* or *-o*. Rule: Choose *-o*. Ex.: *Altho* (Bunyan), *tho* (Bunyan). *thoro*, *boro* (in place names).
8. Words with the verb suffix, of Greek origin, spelled *-ise* or *-ize*. Rule: Choose *-ize*. Ex.: *Catechize, criticize, exorcize, legalize*, etc.
9. Words spelled with *-ite* or *-it*. Rule: Omit *e*. Ex.: *Deposit, preterit*.
10. Words spelled with *-il* or *-l* (*-ill* or *-il*). Rule: Choose *-l*. Ex.: *Distil, fulfil, instal*.
11. Words spelled with *-il-ness* or *-l-ness*. Rule: Omit one *l*. Ex.: *Dulness, fulness*.
12. Words spelled with *-mme* or *-m*. Rule: Omit *-me*. Ex.: *Gram, program*.
13. Words spelled with *œ*, *æ*, or *e*. Rule: Choose *e*. Ex.: *Ecumenical, œsophagus*.
14. Words spelled with *-our* or *-or*. Rule: Choose *-or*. Ex.: *Favor, fervor, flavor, honor, labor, rigor, rumor, tenor, tumor, valor, vapor, vigor*.
15. Words spelled with *ph* or *f*. Rule: Choose *f*. Ex.: *fantasm, fantasy, fantom, sulfat, sulfur*.
16. Words spelled with *-rr* or *-r*. Rule: Omit one *r*. Ex.: *Bur, pur*.
17. Words spelled with *-re* or *-er*. Rule: Choose *-er*. Ex.: *Center, meter, miſter, niſter, sepulcher, theater*.
18. Words spelled with *s* or *z* (in the root). Rule: Choose *s*. Ex.: *Apprise, assize, comprize, raze, surprize, teazel*.
19. Words spelled with *-s-* or *so-*. Rule: Omit *e*. Ex.: *Similar, with*.
20. Words spelled with or without silent *-ue*. Rule: Omit *-ue*. Ex.: *Catalog, decalog, demagog, pedagog, prolog*.

"THE THREE HUNDRED WORDS."

The spelling at the left is the one recommended.

abridgment	abridgement
accouter	accoutre
accure	accured
acknowledgment	acknowledgement
address	addressed
adze	adze
affix	affixed
altho	although
anapest	anapest, anapest
anemia	anemia, anemia
anæsthesia	anæsthesia, anæsthesia
anæsthetic	anæsthetic, anæsthetic
antipyrine	antipyrine
antitoxin	antitoxine
apothem	apothegm, apophthegm
apprize	apprise
arbor	arbour
archeology	archæology, archæology
ardor	ardour
armor	armour
artisan	artisan
assize	assise
ax	axe
bans	banns
bark	barque
behavior	behaviour
blest	blessed

ORTHOGRAPHY

blusht
brasen
brasier
bun
bur
caliber
caliper
candor
carest
catalog
catechise
center
chapt
check
checker
chimera
civilise
clamor
clangor
clapt
clasp
clipt
clue
coeval
color
colter
commixt
comprest
comprise
confest
controller
coquet
criticise
cropt
crost
crusht
cue
curst
outlas
cyclopaedia
dactyl
dasht
decalog
defense
demagog
demeanor
deposit
deprest
develop
diereais
dike
dipt
discust
dispatch
distil
distrest
dolor
domicil
draft
dram
drest
dript
droopt
dropt
dulness
ecumenical
edile
egis
enamor
encyclopedia
endeavor
envelop
Eolian
eon
epaulet
eponym
era
esophagus
esthetic
esthetics
estivate
ether
etiology
exorcize
express
fagot
fantasm
fantasy
fantom
favor
favorite
fervor
fiber
fixt
flavor
fulfil

blushed
brasen
brasier
bunn
burr
calibre
calliper
candour
caressed
catalogue
catechise
centre
chapped
cheque
chequer
chimæra, chimera
civilise
clamour
clangour
clapped
clasp
clipped
clew
coeval, oöeval
colour
coultter
commixed
compressed
comprise
confessed
comptroller
coquette
criticise
cropped
crossed
crushed
quete
curst
outlass
cyclopaedia, cyclopædia
dactyle
dashed
decalogue
defence
demagogue
demeanour
deposit
depressed
develope
diæresis, diæresis
dyke
dipped
discussed
despatch
distill
distressed
dolor
domicile
draught
drachm
dressed
dripped
drooped
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dulness
oecumenical, oecumenical
ædile, ædile
ægis, ægis
enanour
encyclopaedia, -pædia
endeavour
envelope
Æolian, Æolian
æon, æon
epaulette
eponyme
æra, æra
oesophagus, œsophagus
æsthetic, æsthetic
æsthetics, æsthetics
æstivate, æstivate
æther, æther
ætiology, ætiology
exorcise
expressed
faggot
phantasm
phantasy
phantom
favour
favourite
fervour
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fixed
flavour
fulfill

ORTHOGRAPHY

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gage
gasel
gelatin
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giose
glycerin
good-by
gram
gript
harbor
harken
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hematin
hiccup
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homeopathy
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paleolithic
paleontology
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paraffin
parlor
partisan
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patronise
pedagog
pedobaptist
phenix
phenomenon
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practise, v. and n.
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hæmatin, hæmatin
hiccough
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homoeopathy, homœo-
homonym
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hypothénuse
idolise
impressed
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lachrymal
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legalise
licence
liquorice
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lopped
lustre
mammas
manœuver, manœuvre
materialise
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mediasval, mediasval
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mixed
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naturalise
neighbour
nitre
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odour
offence
omelette
oppressed
orthopaedic, orthopædic
palæography, palæo-
palæolithic, palæolithic
palæontology, palæo-
palæozoic, palæozoic
paraffine
parlour
partisan
passed
patronise
pedagogue, pedagogue
pædobaptist, pædo-
phoenix, phœnix
phaenomenon, phenom-
pygmy
plough
polype
possest
practise
prefixed
prænomen, prænomen
preseed
pretence
preterite, præterite
prætermitt, prætermitt
primæval, primæval
professed
programme
prologue
propped

pur	purr
quartet	quartette
questor	quaestor, quæstor
quintet	quintette
rancor	rancour
rapt	rapped
raze	rase
recognize	recognise
reconnoiter	reconnoitre
rigor	rigour
rime	rhyme
ript	ripped
rumor	rumour
saber	sabre
saltpeter	saltpetre
savior	saviour
savor	savour
scepter	sceptre
septet	septette
sepulcher	sepulchre
sextet	sextette
silvan	syllvan
simitar	scimitar, cimeter, etc.
sipt	sipped
sithe	scythe
skilful	skillful
skipt	skipped
slipt	slipped
smolder	smoulder
snapt	snapped
somber	sombre
specter	spectre
splendor	splendour
stedfast	steadfast
stept	stepped
stopt	stopped
street	streessed
stript	stripped
subpoena	subpoena, subpcena
succor	succour
suffixt	suffixed
sulfate	sulphate
sulfur	sulphur
sumac	sumach
supprest	suppressed
surprise	surprise
synonym	synonyme
tabor	tabour
tapt	tapped
teasel	teasel, teasle, teazle
tenor	tenour
theater	theatre
tho	though, tho'
thoro	thorough, thoro'
thorofare	thoroughfare
thoroly	thoroughly
thru	through, thro', thro
throust	throughout
tipt	tipped
topt	topped
toet	toessed
transgrest	transgressed
trapt	trapped
tript	tripped
tumor	tumour
valor	valour
vapor	vapour
vext	vexed
vigor	vigour
visor	visor
wagon	waggon
washt	washed
whipt	whipped
whisky	whiskey
wilful	willful
winkt	winked
wisht	wished
wo	woe
woful	woeful
woolen	woollen
wrapt,	wrapped

A second list of more difficult or anomalous forms was issued by the Board early in 1908, and a third in 1909.

Orthoped'ic Sur'gery, that branch of surgery which treats the deformities and malformations of the human body, particularly those of the bones and muscles, by both surgical and mechanical measures. The prevention of deformity in children subject to rickets, etc., is effected by good hygiene supplemented by the

application of braces and other artificial supports. Malformations of bones may be corrected in older persons by separating the bone and resetting it at a correct angle; this is often done for bowlegs, knock-knees, etc. Tenotomy or tendon cutting is used to relieve the contraction which causes clubfoot. The immovable condition consequent upon hip, knee, and ankle joint disease may be overcome by the "bloodless surgery" manipulations introduced by Dr. Lorenz, which consist simply in breaking up the binding adhesions by forcible movements of the anesthetized patient.

Orthop'tera, order of insects with chewing jaws, which undergo partial transformation, and the larvæ and pupæ of which, though wingless, are active; contains the groups of runners (earwigs and cockroaches), graspers (*mantes* or soothsayers), walkers (specters and walking leaves), and jumpers (crickets, grasshoppers, and locusts).

Or'tolan, bunting of the genus *Emberiza*. *E. hortulana* is about 6½ in. long; upper parts reddish bay, each feather black in the middle; below bay red, tipped with gray. Rare in England, it is very abundant in S. Europe, where great numbers are caught in snares in



ORTOLAN

early autumn, and fattened for the table in constantly lighted rooms on oats, millet, and spiced bread, on which the flesh becomes very fat and of a high and delicious flavor; they are considered perfect when they attain the weight of 3 oz. It is a handsome bird, and has a flutelike warble, but is chiefly prized for the table.

Or'ton, Edward, 1829-99; American geologist; b. Deposit, N. Y.; Prof. of Natural Sciences, New York State Normal School, 1856-59, and at Antioch College, 1866-73; president of Antioch College, 1872-73; of State Univ. of Ohio, 1873-81; Prof. of Geology, State Univ. of Ohio, after 1873; assistant geologist, Geological Survey of Ohio, 1869-83; state geologist of Ohio after 1883; president American Association for the Advancement of Science, 1898-

99; in geology gave chief attention to economic problems, especially those connected with the distribution of petroleum, natural gas, and coal.

Orton, James, 1830-77; American naturalist; b. Seneca Falls, N. Y.; became a Congregational minister, 1860; instructor in Natural Science in Rochester Univ., 1866; was at the head of the Williams College expedition which crossed the Andes of Ecuador and descended the Napo and Amazon, 1867-68; became Prof. of Natural History in Vassar College, 1869; made another journey to S. America, ascending the Amazon and visiting Peru, 1873; attempted to explore the river Beni, from Bolivia, 1877, but was forced to return after being deserted by his Indian canoemen, and died on Lake Titicaca; chief work, "The Andes and the Amazon."

Ortygia (ār-tij'ī-ā). See **DELOS**.

Orvieto (ōr-vē-ā'tō), city in province of Perugia, Italy; 78 m. NNW. of Rome; crowns an abrupt volcanic hill near the confluence of the Chiana and the Paglia, about 8 m. from Lake Bolsena. The Pozzo di San Patrizio (a circular well with 250 steps, excavated by Clement VII, 1527, after the famous sack of Rome) is worthy of notice; but the great boast of Orvieto is its beautiful cathedral, founded, 1290, in honor of the famous miracle of Bolsena. Orvieto was not conspicuous under the Romans, but on the breaking up of the empire declared itself independent, and being Guelph in its policy was long a safe refuge for fugitive popes. Pop. (1901) 18,430.

Osage (ō'sāj) **Or'ange**, N. American tree, *Maclura aurantiaca*, of the family *Urticaceæ*,



OSAGE ORANGE.

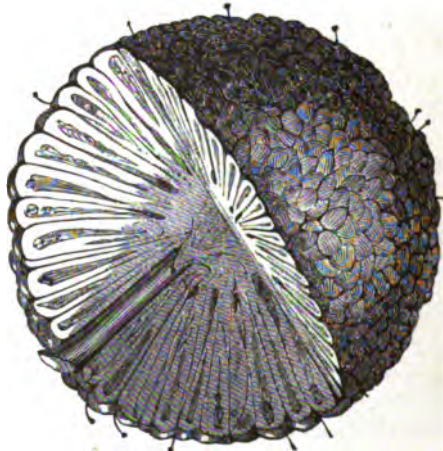
native to the Arkansas region; has a handsome, tough, and durable yellow wood; fruit large, yellow, and somewhat like an orange, whence the name, but not edible; principal use of the tree is as a hedge plant.

Osaka (ō'sā-kā), second city of Japan in population and importance; in early times its

capital; on bay of same name at the mouth of the river Yodogawa. For purposes of foreign trade Osaka is united with Hiogo, one hour distant by rail. Until the fifteenth century it bore the name of Naniwa; it dates its modern greatness from the time of Hideyoshi, who made it the seat of government, and founded the magnificent castle, still used as barracks. The city is the commercial center of the empire, and the great rice emporium. The most important Government building is the mint, opened, 1871, for the coining of bullion. Close to Osaka is Sakai, where are made cotton rugs which are largely exported. On an island in the Yodogawa is the small foreign settlement. In 1911 a large part of Osaka was destroyed by fire. Pop. (1903) 995,945.

Os'car I, Joseph Francis, 1799-1859; King of Norway and Sweden; b. Paris, France; only child of Bernadotte; married Josephine, daughter of Eugène Beauharnais; succeeded to the throne, 1844; instituted liberal measures, but his projected parliamentary reform was baffled by the nobility; composed music; published a work on prisons and the punishment of crime; retired, 1857, appointing as regent his son, the future Charles XV.

Oscar II, Friedrich, 1829-1907; King of Sweden; b. Stockholm; third son of preceding; married Sophie, daughter of Duke Wilhelm of Nassau, 1857; succeeded to throne of Norway and Sweden on death of his brother, King Charles XV, 1872; on repeal of the union of Norway and Sweden, 1905, he was asked to permit a prince of his house to become sovereign of the independent Kingdom of Norway, but declined; transferred "Faust" into Swed-



FRUIT CUT TO SHOW THE STRUCTURE.

ish; published several volumes of poems and miscellaneous writings. Succeeded by his son, Gustav V.

Osceola (ōs-ē-ō'lā), 1804-38; chief of the Seminole Indians; b. in Georgia; son of William Powell, an Englishman, by an Indian mother; early distinguished for ability, cour-

age, and hatred of the whites; attained great influence among the Seminoles, and strongly opposed the cession of the tribal lands in Florida. In 1835 his wife, the daughter of a fugitive slave, was stolen as a slave, and Osceola, demanding her release of Col. Thompson, U. S. agent at Fort King, used language which the latter resented, and the chief was put in irons. Six months later Thompson was murdered; the battle on the Withlacoochie, the massacre of Dade, the assaults on Forts Micanopy and Drane, and other spirited actions followed, in which the Indians more than held their own against very great odds; but during a conference with Gen. Jessup, under a flag of truce, Osceola was treacherously seized (1837), and imprisoned at Fort Moultrie, S. C., where he died.

Oscines (ôs'sî-nêz), term applied to a group of *Passeres* containing those with a highly developed singing apparatus, having five or six pairs of tracheal muscles attached to the ends of the upper bronchial half rings. The group, or suborder, contains over nine tenths of the passerine birds.

O'Shaughnessy (ô-shâ'né-sî), **Arthur William Edgar**, 1846-81; English poet; b. London; in 1864 entered the British Museum; belonged to the neoromantic group of poets, followers of Morris and Swinburne and of the French romantic school; published "An Epic of Women," "Lays of France," a free paraphrase of the *lais* of Marie de France, "Music and Moonlight," and "Songs of a Worker."

Osh'kosh, capital of Winnebago Co., Wis.; on Lake Winnebago at mouth of Fox River; 35 m. NW. of Milwaukee; has a U. S. Govt. building, State Normal School, National State Hospital for Insane, County Hospital for Incurable Insane, State School for Deaf and Dumb, large and diversified lumber interests, and manufactures of furniture, carriages, and wagons, foundry and machinshop products, flour and grist, tobacco, besides meat-packing and shipbuilding plants. Pop. (1910 census) 33,062.

Oslander (ô-zê-ân'dér), **Andreas** (real name **HOSEMANN**), 1498-1552; German reformer; b. near Nuremberg; pastor at Nuremberg, 1522-48; then pastor and Prof. of Theology at Königsberg; an ardent adherent of Luther and labored with great energy for the Reformation; maintained the righteousness of Christ is not imputed to us, but infused into us; propagated opinions concerning penitence, the divine image in man, the two natures of Christ, and justification, which were combated by Melancthon, and led to a bitter controversy which lasted for years after his death, ending in the execution of his son-in-law Funck and three of his friends.

Osier (ô'zhér), willows the long and pliant shoots of which are used for basket making. In England the basket makers use the name exclusively for the rods of the white osier (*salix viminalis*) and a few other soft kinds, while the harder and better rods produced by other species are known as basket willows, or

simply willows. In English works thirty or forty species and varieties of willow are named



COMMON OSIER.

Staminate and Pistillate, Catkins and Flowers.

as producing useful osiers, some of which are naturally large trees.

Osi'ris, one of the principal divinities of ancient Egypt. He is the son of Seb (Cronos, time), and represents the element of water, symbolizing in a higher sense finished existence, or the past. He is represented as the originator of human civilization. In a terrible contest with Typhon, or Evil, Typhon prevails; Osiris is slain, and his dead body is thrown into the Nile, and swept out to sea. Isis, the consort of Osiris, finds it mutilated by Typhon. Then Osiris descends into the infernal regions, and has a later existence under the name of Serapis. By him all the dead are judged. Ancient writers say the Egyptians believed that the soul of Osiris entered the bull Apis, and it is assumed that the Temple of Serapis mentioned by the Greeks was the Temple of Osarapi, or Osiris Apis.

Osman (ôs-mân'). See **OTHMAN**.

Osmanie (ôs-mâ'nî-â), Turkish order established by Abdul Aziz, 1802, for the reward of services rendered to the state; chief decoration is a golden six-pointed star enameled in green.

Osman Pasha (ôs-mân' pâsh-â'), 1832-1900; Turkish military officer; b. Tokat, Asia Minor; fought in the Crimean War, the Cretan campaign, and the Serbo-Turkish War; at outbreak of the Russo-Turkish War was commander of the Fifth Army Corps. Defeated at Scarevitze, he intrenched himself at Plevna, which he held, August 31-December 10, 1877, when he surrendered with 43,000 men, and was treated with unusual consideration by the Russians in recognition of his remarkable defense. After the conclusion of peace he was several times Minister of War and Grand Marshal of the Palace.

Osmium, element, one of the "platinum metals"; that is, found in association in nature with platinum. Its only ore is a native

compound with another metal of the same natural group, iridium, forming the mineral metallic alloy called iridosmine, or osmiridium, which is exceedingly hard, and used for tipping gold pens.

Osmo'sis, the tendency to interchange between two liquids or gases when they are separated by a membrane. If a bladder containing brine is suspended in a pail of water, some of the water will pass into the brine, even to the extent of further stretching the bladder. This inward flow is *endosmosis*, while the corresponding outward flow of the brine into the water is *exosmosis*. The flow is generally greater from the lighter to the heavier liquid, until the density of the two liquids is uniform. Solutions containing crystallizable substances osmose readily, while solutions of gummy or colloid substances will not osmose. This distinction is utilized to separate mixtures of crystals and colloids. (See **DIALYSIS**.) Osmosis is an important process in the growth and nourishment of animal and vegetable life. See **DIFFUSION**.

Os'prey. See **FISH HAWK**.

Ossa, in ancient geography, a mountain 6,400 ft. high on the E. side of Thessaly, near Pelion, and separated from Olympus by the vale of Tempe. The ancients placed the seat of the Centaurs and Giants in the neighborhood of Pelion and Ossa.

Osse'tish, Iranian language; the speech of the Caucasus folk Ossetians; the extreme NW. people of the Iranians; are somewhat separated by other tribes from the main body of the race, but their speech is none the less Iranian.

Ossian (ôsh'ân), Celtic bard, supposed to have flourished in the second or third centuries of the Christian era, whose compositions in Celtic were for many ages preserved among the Scottish and Irish peasantry. His father Fingal was one of the most famous of the Celtic legendary heroes. Public attention was first called to the Celtic poetry of Scotland by Alexander McDonald, who published, 1751, a volume of his own songs in Gaelic. In 1760 James Macpherson published, under the title of "Fragments of Ancient Poetry Collected in the Highlands of Scotland," sixteen short pieces, which he said were episodes of a long poem by Ossian on the wars of Fingal. These were followed by the publication, 1762, of "Fingal," and, 1763, of "Temora," with five minor poems, translated by Macpherson into English prose. All were then collected in a single volume as "The Poems of Ossian," 1765. They created a prodigious sensation, resulting in a fierce controversy. In Scotland their merit and their authenticity were maintained by nearly all the leading men of letters, while in England Dr. Johnson denounced them as impudent forgeries, the composition of Macpherson himself. The Highland Society of Edinburgh investigated the subject abt. 1805, and recent scholars have reached the same conclusions—that Macpherson had originals to work on, found in the living oral tradition; that these originals were very old, or made up of

very old materials, developed and elaborated in the popular imagination, and were not indeed poems of Ossian, but Ossianic poems; that Macpherson used his materials with great freedom, and mixed with the heroes of the Ossianic cycle those of the cycle of Ulster; and that the style, tone, and manner of Macpherson's versions are very different from the older forms of the traditions, and are the work of the translator himself.

Os'sining, village in Westchester Co., N. Y.; prior to 1901 known as **SING SING**; on the Hudson River at altitude of 300 ft.; commands an exceptionally fine view of the river, here in its widest reach, where the Tappan Zee and Haverstraw Bay are separated by the long peninsula known in Revolutionary times as Teller's Point (where the *Vulture* waited for Arnold and André), and now as Croton Point, famous for its vineyards. The Croton aqueduct crosses Kill Brook by a magnificent stone arch of 88 ft. span and 70 ft. above the stream, and beneath this arched bridge is a second one for highway uses. Here is one of the most noted prisons in the U. S., also a soldiers' monument, St. John's School, Mt. Pleasant and Holbrook military academies, and manufactures of lime, medical supplies, sleighs, carriages, cotton gins, gas and water pipes, tools, and steam engines. Pop. (1910) 11,480.

Os'soli, Sarah Margaret Fuller (Marchioness), 1810-50; American author; b. Cambridgeport, Mass.; became an accomplished linguist; conspicuous in the literary set comprising also Emerson, Hawthorne, and Channing; edited *The Dial*; contributed to the *New York Tribune*; married Marquis Giovanni A. Ossoli in Rome, Italy, 1847; was directress of a hospital during the siege of the city by the French, 1849; perished with husband and son in shipwreck at Fire Island, near New York City; chief works, "Woman in the Nineteenth Century" and "Papers on Art and Literature."

Ostend', town in province of W. Flanders, Belgium; on the German Ocean; 77 m. WNW. of Brussels; has a good harbor, is fortified, and communicates daily by steamers with London and Dover. Besides manufactures of linen, sailcloth, and ropes, it has important fisheries of oysters, cod, and herrings, and an active traffic in the transport of butter, rabbits, etc. In the summer season it is the resort of many thousand visitors. Pop. (1907) 42,409.

Ostend Manifest'o, memorandum regarding the acquisition of Cuba, drawn up by the U. S. ministers to England, France, and Spain, 1854. Its substance was: The ministers urge the purchase of Cuba from Spain for \$120,000,000. The island is regarded as necessary to the U. S., and the sale as advantageous to Spain. If the offer is refused, then "self-preservation is the law of nature." It will be necessary to consider whether Cuba is not essential to the welfare of the U. S. If this question is answered in the affirmative, then the U. S. is "justified in wresting it [Cuba] from Spain." The manifesto was sharply criticised in the U. S. and unfavorably noticed abroad. Historically it

may be viewed as (1) a link in the chain of the slave power and (2) as a bold step in the path of territorial expansion.

Osteop'athy, method of treating diseases of the human body without the use of drugs, by means of manipulations applied to various nerve centers, chiefly those along the spine, with a view to inducing free circulation of the blood and lymph, and an equal distribution of the nerve forces. Special attention is given to the readjustment of any bones, muscles, or ligaments not in the normal position. The system was formulated, 1874, by Dr. A. T. Still, a physician of Baldwin, Kan. Osteopathy does not confine itself to a treatment of maladies of the bones, nor does it find in diseased bones the origin of all pathological conditions. The name was considered by Dr. Still as applicable to his system because of the relative importance which his theory gives to anatomy, and because of his belief that "the bones could be used as levers to relieve pressure on nerves, arteries, and veins." No machines or appliances are used. Among the complaints said to have been treated successfully are heart and lung diseases, nervous prostration, sciatica, lumbago, all forms of neuralgia, and paralysis, asthma, catarrh, incipient consumption, spinal curvature, eye and ear affections, and all dislocations, liver, kidney, stomach, and intestinal affections.

Os'tia, city of Latium, at the mouth of the Tiber, 16 m. SW. of Rome by the Via Ostiensis. In the time of the second Punic War it was an important naval station; but its port gradually filled up, and the Emperor Claudius constructed an artificial harbor 2 m. W., on the opposite (right) bank, called Portus Augusti. Despite the rivalry of the town of Portus, which sprang up around the new harbor, Ostia continued to prosper, and contained in its zenith 80,000 inhabitants; but abt. 830 A.D. it was entirely in ruins. The modern Ostia is a small malarious town, which, though originally founded on the sea, is now 3 m. from it.

Os'tracism, derived from the word meaning shell or tile, upon which was written the name of the person who, in Athenian history, was banished from the state for a limited period because he was deemed dangerous to the republic. At first the banishment was for ten years, but it was afterwards reduced to five. It involved no dishonor, nor any loss of property. The senate and public assembly determined whether ostracism was advisable; a day was then appointed, and a space in the agora inclosed, where each citizen deposited in a prepared receptacle an oyster shell or potsherd inscribed with the name of the person whom he wished banished. If there were 6,000 votes against any one person, that person had to leave the city within ten days. Among distinguished men ostracized were Aristides, Themistocles, and Cimon.

Os'trich, largest of living birds, belonging to the family *Struthionidæ* and order *Struthiones*, distinguished by its great size and by having only two toes on each foot. Its scientific name

is *Struthio camelus*. The adult male stands nearly 8 ft. high and weighs upward of 200 lb. The plumage, including the wing and tail feathers, which furnish the large plumes of commerce, is loose and wavy. The ostrich inhabits the sandy plains of Africa from the Barbary States to Cape Colony, but in many



AMERICAN OSTRICH.

places has been exterminated, or nearly so, for its feathers. In former days it was found over a considerable portion of SW. Asia, but is now practically restricted to central Arabia. The females lay their eggs to the number of about thirty in one nest, a shallow pit scooped in the sand, and during the day they are mostly left to the heat of the sun. At night the male sits



AFRICAN OSTRICH.

on the eggs and they are rarely left unguarded in the daytime. The ostrich trusts to flight for protection, but can inflict a dangerous blow with its foot. Ostrich farming is extensively carried on in S. Africa, and to a far less extent in N. Africa, S. America, and S. California.

Os'trogoths. See GOTHs.

Ostrolen'ka, town in government of Lomza, Poland; on the Narew. An encounter took place here, February 16, 1807, between the French under Savary and the Russians under Essen, in which the former were victorious. The place became still more famous by the battle fought here, May 26, 1831, between the Poles under Skrzynecki and the Russians under Diebitsch. After a long and bloody contest the Poles were forced to retreat, but the Russians were unable to follow them on account of their own losses. Pop. (1897) 8,679.

Ostrovski (ôs-trôf'skâ), **Alexander Nikolae-vich**, 1824-86; Russian dramatist; b. Moscow; first became known by a couple of scenes which appeared in Moscow newspapers, 1847. Two years later he established his reputation with "We Get On with Our Own Kind," one of his best comedies. Among his best plays are "The Poor Bride," "Poverty is Not a Fault," "A Profitable Place," "The Storm," and "A Warm Heart."

Ostrovski, Antoni Joannes (Count), 1782-1847; Polish patriot; b. Warsaw; son of the following; was made a member of the provisional government of the duchy of Warsaw; fought under Napoleon; entered the Polish Senate after the death of his father; was one of the leaders of the Polish revolution of 1830; wrote the manifesto which the last remnant of the Polish army issued, 1831, to the kings and nations of Europe, after laying down their arms. Afterwards lived in France.

Ostrovski, Tomasz Adam Rawicz (Count), 1739-1817; Polish statesman; b. Ostrow; member of a family descending from the palatinate of Lublin; took a very active part in the establishment of the constitution of May, 1791, and was appointed Minister of Finance, but resigned when the king shortly after joined the confederacy of Targowicza. On the establishment of the duchy of Warsaw he was made grand marshal of the Diet, 1809, and president of the Senate, 1811. The Poles received their new constitution of 1815 from his hands.

Os'wald, Saint, abt. 605-42; King of Northumbria; was the son of King Ethelfrid, and, 634, recovered his kingdom from Ceadwalla. He and his wife were the earliest promoters of the Christian religion among the Anglo-Saxons. He fell in battle against Penda, the heathen King of Mercia, and was canonized.

Oswego, capital of Oswego Co., N. Y.; on Lake Ontario, at mouth of Oswego River and N. terminus of Oswego Canal; 35 m. NNW. of Syracuse; has two harbors, U. S. Govt. building, U. S. life-saving station, State Normal School, Gerritt Smith Library, Old Ladies' Home, St. Francis Home for Orphans, public hospital, orphan asylum, abundant water power, and boiler works, starch works, knitting factories, car-building and repair shops, shade-cloth and match factories, extensive lumber yards, and at its outer harbor immense coal trestles. The city is a port of entry, is defended by Fort Ontario, commanding the entrance to the harbor, is one of the oldest settlements in the state, and was the last point

surrendered by Great Britain to the U. S. Pop. (1910) 23,368.

Osymandyas (ôs-i-mân'di-äs), name of a king of Egypt, mentioned by Diodorus and Strabo, who reigned, according to these authors, as the twenty-seventh successor of Sesostris; said to have distinguished himself by his victories; invaded Asia with an army of 400,000 men and 20,000 cavalry, and conquered the Bactrians, rendered tributary to Egypt by Sesostris. In honor of this exploit he erected a monument, at once a palace and a tomb, which, under the name of Osymandeion, was renowned for its size and splendor. Great difficulty has been felt in reconciling the descriptions of its magnificence in ancient writings with the dimensions of the existing relic.

Otaheite (ô-tâ-hê'tâ). See TAHITI.

Otaru (ô-tâ'rô), town of Japan, on Yezo or Hokkaido Island and on Ishikari Bay; has an excellent, protected harbor, railway connection with Sapporo and the Poronai coal mines, and valuable fisheries. Pop. (1903) 79,361.

Otfried (ôt'frêt), German poet; a Frank by birth; went to St. Gall, and was afterwards monk in the Benedictine monastery at Weissenburg, Alsace. Here he wrote, with the avowed purpose of displacing the worldly songs of the people, his famous "Book of the Evangelists," a paraphrase in verse of the Gospels.

Othman (ôth-mân'), or **Osman'**, name of several Ottoman emperors: **OTHTMAN I** (called **GHAZI**, "the Victorious"), 1259-1326; succeeded his father, Ertogral Shah, a Turkish chieftain, as principal commander of Alaeddin III, Seldjuk Sultan of Roum, 1288. The Seldjuk Empire falling to pieces, 1289, Othman at Kara Hisar was proclaimed emperor of the Ottomans, 1300. His kingdom comprised parts of Bithynia and Phrygia; his life was passed in petty but advantageous wars with the Byzantine Empire. From him the Ottoman or Osmanli Empire and people derived their name. **OTHTMAN II**, 1604-22; succeeded Mustapha I, 1617. His reign was convulsed by frequent rebellions of the Janizaries, and by a disastrous war with Poland. Imprudently threatening to suppress the Janizaries, he was dethroned by them and strangled. **OTHTMAN III**, 1700-57; succeeded his brother, Mahmoud I, 1754; was effeminate, and his reign uneventful.

Othman, or **Osman Ibn Affan** (ib'n âf-fân'), 574-655; third caliph of the Mussulmans; relative and secretary of Mohammed, whose daughters, Rubiya and Um-Sul-sum, he married. On the assassination of Omar, 644, he was chosen caliph, mainly through the influence of the Korish. During his caliphate Armenia and Asia Minor were partially subdued, 646, and Cyprus, Crete, Rhodes, and Cos conquered; but his reign was distracted by numerous insurrections. When he ordered Mohammed, the son of Abubekir, to be put to death, the latter marched on Medina without opposition, and stabbed the caliph on the pulpit steps.

O'tho, 1815-67; King of Greece; b. Munich; second son of Louis I, King of Bavaria. Nom-

inally chosen king by the Greeks (May 7, 1832), he was really appointed by France, Great Britain, and Russia, with scant regard to Greek aspirations; married Princess Amelia of Oldenburg, 1836. Surrounding himself with Bavarians, insisting on German as the official language, despotic and reactionary in policy, he was soon detested by his subjects; deposed, 1862; returned to Bavaria, and died in obscurity at Bamberg.

Otho, Marcus Salvius, 32-69; Roman emperor; was a companion of Nero, but was practically exiled by the latter, who conceived a passion for his wife, Poppæa Sabina, and was sent to take charge of Lusitania (Portugal). On the revolt of the provinces against Nero he joined the forces of Galba, hoping to be designated as his successor. When, however, Galba adopted L. Calpurnius Piso, Otho won over the prætorian guard, which murdered Galba and Piso, and on the same day (in January, 69) the Senate clothed him with the imperial dignities. Vitellius, who had been proclaimed emperor by the Army of the Lower Rhine, now advanced on Rome to make good his claim. Otho resisted him, and for a time was successful, but a portion of his army suffering defeat near Cremona, he lost heart and committed suicide.

Otho of Freising, 1114-58; German historian; grandson of Henry IV and uncle of Friedrich I; entered the Cistercian monastery of Morimund, 1130, and was, 1137, appointed Bishop of Freising. Author of a "Chronicle of the World," a "History of Frederick Barbarossa," etc.

Othoes (Egyptian, TETA), name given by Manetho to the first king of the sixth Egyptian dynasty. According to Manetho (Africanus), Othoes-Teta ruled thirty years. He was the first king to assume the royal title, which was ever afterwards customary, "Son of Ra." The name Teta also belonged to the second king of the first dynasty, reported to have been a writer on medicine and anatomy, and later to the sixth king of the third dynasty, who is called Tosertasis by Manetho.

Otis, James, 1725-83; American patriot; b. W. Barnstable, Mass.; began law practice at Plymouth, 1746; removed to Boston, 1750; in 1761, when advocate general of the admiralty, refused to argue in favor of the writs of assistance, and resigned his office to plead the people's cause; 1762, was elected to the state legislature, and, 1765, on his motion, the Stamp Act Congress met in New York City, to which he was a delegate. His speeches and pamphlets placed him at the head of the patriotic party in Massachusetts; 1769, he denounced in print the commissioners of customs, and on September 9th, meeting one of the commissioners in a coffeehouse, he was attacked, and received a cut on his head which led to derangement; took part, however, in the battle of Bunker Hill; retired to Andover, where he was killed by lightning. His published works include "Vindication of the Conduct of the House of Representatives," 1762; "Rights of

the British Colonies Asserted," 1765; and "Consideration on Behalf of the Colonists," 1765.

Otranto (ô-trân'tô), Duke of. See FOUCHÉ.

Ot'tawa, capital of Dominion of Canada and Carleton Co., Ont.; at junction of Ottawa, Rideau, and Gatineau rivers; on the Rideau Canal; 95 m. NE. of Kingston, 120 m. W. of Montreal. It is on the S. bank of the Ottawa River, from which it rises by a succession of bluffs to Parliament Hill, 160 ft. above tide-water, on which the principal government buildings have been erected, and is bisected by the Rideau Canal. The scenery at every turn is very beautiful, comprising a grand display of architectural skill, river, mountain, and forest attractions, and two picturesque waterfalls, Chaudière, on the W. of the city, and Rideau, about 1 m. E. of the center of the city. The city has an improved drainage system and a waterworks plant, which brings water from an intake some 3,000 ft. above Chaudière Falls to the city by direct pumping, rendering a reservoir unnecessary. There are a number of public parks and squares, including Parliament Hill and Major's Hill, both under control of the Federal Government; Lansdowne Park, on the Rideau Canal; Cartier Square, containing a drill hall, used as a parade ground by the local militia and as an athletic field by various societies; and Rockcliffe Park, a short distance NE. of the city, which has become a popular place of recreation and a hot-weather resort.

The most notable of the public buildings are those built on three sides of a quadrangle on Parliament Hill. They comprise the Parliament Building, the E. Departmental Building, the W. Departmental Building, and the Langevin block, the latter on Wellington Street, nearly facing the Parliament Building. They are separate buildings, almost pure Gothic in architecture, and with walks and drives occupy an area of 30 acres. Other Federal buildings are those occupied by the Supreme and Exchequer courts, the Geological and Natural History Survey, and the National Art Gallery and Fishery Exhibit, and the Cartier Square drill hall. About 1½ m. from the Parliament Building is Rideau Hall, in a domain of 78 acres, the official place of residence of the governor general of the Dominion. Ottawa is the seat of an Anglican bishopric and a Roman Catholic archbishopric. At the head of the educational institutions is the Univ. of Ottawa, founded as a college 1848, made a university 1866, and raised by the pope to the rank of a Roman Catholic university 1889. There are also a normal school, a collegiate institute, the Coligny Young Ladies' College, and a number of nunneries and convents. Abundant water power for manufacturing purposes is furnished by the Ottawa River. The industrial establishments comprise paper mills, railway car and repair shops, indurated ware, wooden ware, match, carriage, stove, and furniture factories, foundries, planing and flour mills, and granite works. The city is one of the largest lumber markets in the world. Ottawa was founded 1826; known as Bytown till 1854, when it received a city charter under its

present name. In 1858 it was selected for the permanent seat of government of united Canada, and, 1867, was made the capital of the Dominion. On April 26, 1900, Hull, on the opposite side of the Ottawa, and a large part of Ottawa were destroyed by fire, causing a loss of over \$15,000,000. Pop. (1911) 73,193.

Ottawa Riv'er, river in Canada; boundary between the provinces of Ontario and Quebec (except in the very lowest parts of its course); rises on the divide between the basin of the St. Lawrence and Hudson Bay; flows SE. and E., communicating with the St. Lawrence at the W. end of Montreal Island; sends off the Rivière des Prairies, between Montreal Island and the Isle Jésus; finally joining the St. Lawrence below the Island of Montreal; has numerous rapids, some flooded out by dams and others surmounted by canals; connected with Lake Ontario by the Rideau Canal; length, 791 m.

Ot'ter, long-bodied, short-legged animal, with a small, flattish head, long, stout, rounded or slightly flattened tail. Otters are carnivorous mammals, belonging to the family *Mustelidae* and subfamily *Lutrinae*. The general color of the long outer coat of hair is a rich brown; the under fur, which in N. species is thick and valuable, is much lighter. Otters are aquatic in their habits, dwell in burrows by the water, and feed on fish. The common European otter (*Lutra vulgaris*), found throughout a great part of Europe and Asia, attains a length of



SEA OTTER.

3 ft. 6 in. and a weight of 18 to 24 lb. The N. American species (*L. canadensis*), which occurs from Florida to Canada and from Maine to Alaska, is sometimes 4 ft. 6 in. long. The sea otter (*Enhydra lutris*), the sole member of the subfamily *Enydrinae*, is a marine species found from California N. through the Aleutian Islands to Kamchatka and the Kuril Islands. It attains a length of 4 ft., and is strictly aquatic, being often found in the open sea, sleeping and rearing its young in the water. The fur of this animal, which is very thick, soft, and dark-colored, is extremely valuable, good skins bringing \$400 to \$600. In India and China otters are said to be tamed and used to catch fish.

Ot'terbein, Philip William, 1726-1813; founder of the Church of the United Brethren in Christ; b. Dillenburg, Germany; entered the Reformed ministry, 1749; removed, 1752, to N. America as a missionary; labored especially

in Pennsylvania and Maryland; founded his new church near Frederick, Md., 1800.

Ot'to, Wilhelm Luitpold, 1848- ; King of Bavaria; succeeded to the throne, June 13, 1886, on the death of his brother, Ludwig II; but as he was mentally incapacitated for governing, the rule has continued in the hands of regents, Prince Luitpold, 1886-1912, and Prince Ludwig, since 1912.

Ot'tocar II, abt. 1230-78; King of Bohemia; son of Wenceslas I; revolted against his father, but was defeated, and imprisoned for some time; acquired Austria and Styria by marriage; made a crusade, after succeeding to the throne on the death of his father, 1253, against the heathen Prussians; conquered their country and founded Königsberg; defeated the Hungarians on the Marchfeld, 1260, and took possession of parts of Hungary; inherited Carniola and Carinthia, 1269. In 1273 he opposed the election of Rudolph of Hapsburg as emperor of Germany, and refused to acknowledge him; the consequence was a war, in which Ottocar was defeated and compelled to cede Austria, Styria, Carniola, and Carinthia; again tried his fortune against Rudolph, but was again defeated, and fell in the battle of Jedenspeng.

Ot'toman Em'pire. See TURKEY.

Ottoman Porte. See PORTE.

Ot'to of Ros'es. See ATTAR OF ROSES.

Ottum'wa, capital of Wapello Co., Iowa; on Des Moines River; 75 m. NW. of Burlington; in the center of the Iowa coal fields; derives abundant water power from the river, and from the extent and variety of its manufactures has become known as "the Lowell of Iowa." The city contains a U. S. Govt. building, courthouse, Hawkeye Hospital, normal school, opera house, Union Railway Station, etc.; and foundries, pork-packing establishments, starch mill, oil mill, iron works, ruffler works, bridge works, fine office furniture, and other factories; has a large trade, especially in coal. Pop. (1910) 22,012.

Ot'way, Thomas, 1651-85; English dramatist; b. Trotton, Sussex; became an unsuccessful actor; served in the army; then returned to London and wrote for the stage. His most successful plays were "Don Carlos," "The Orphan," "Caius Marius," "The Soldier's Fortune," "The Atheists," and especially "Venice Preserved," one of the best historical tragedies.

Oudh (owd), former kingdom, later an administrative division of the NW. provinces of British India, now a part of the United Provinces of Agra and Oudh; area, 23,966 sq. m.; pop. (1901) 12,833,077; capital, Lucknow.

Oudinot (ô-dê-nô'), Charles Nicolas (Duke of Reggio), 1767-1847; marshal of France; b. Bar-le-Duc; general of division, 1799; distinguished himself especially in the battle of Friedland and at Wagram, when he was made a marshal and created duke; greatest feat was his maneuver in order to protect the crossing

of the Beresina, 1812. After the Restoration he was made a peer of France and commander of the National Guard.

Ouida (ô-s'dâ). See DE LA RAMÉ.

Ouless (ô-lēs'), Walter William, 1848- ; English portrait painter; b. St. Heliers, Jersey; Royal Academician, 1881; second-class medal at the Paris Exposition, 1878; third-class medal, 1889; one of the most noted British portrait painters.

Ounce, in troy weight, one twelfth of a pound, or 480 gr.; in avoirdupois weight, one sixteenth of a pound, or 437½ gr. troy. In the U. S. the apothecaries' ounce is the troy ounce; in Great Britain, the avoirdupois. In the U. S. the fluid ounce is one twelfth of a wine pint, in Great Britain the twelfth of an imperial pint.

Also name of a large cat (*Felis uncia*) of N. India and Tibet, resembling the leopard, but lower, rougher, paler, and with a longer and



OUNCE (*Leopardus uncia*).

more hairy tail, a thicker fur, and more irregular spots. In parts of S. America the jaguar is called the ounce.

Ouse (ôz), river of England; flows into the Trent and forms the estuary of the Humber; length, 60 m.; navigable from York, 45 m. from its junction with the Trent.

Ousel (ô'z'l). See OUZEL.

Out'lawry, process by which one is excluded from the protection of the law, partly in respect to his property, and partly in respect to his person. The outlaw, says Bracton, forfeits home and country, and becomes an exile. Outlawry was pronounced originally only in cases of treason or felony, when the defendant refused to obey a summons. Next it was extended to flagrant trespasses. Properly it was limited to those processes in which a *capias* lay, that is, a writ or warrant to take the person of the defendant. In criminal cases sentence of outlawry operated as a conviction of the offense itself with which the accused was charged. In treasons and felonies, therefore, he suffered corruption of blood and forfeiture of all his estate, real as well as personal. In civil cases the defendant's failure to appear was accounted a contempt, and drew after it merely a forfeiture of personal prop-

erty and loss of the profits of lands so long as the outlawry lasted.

Outram (ô'trām), Sir James, 1803-63; English military officer; b. Derbyshire; entered service of East India Company, 1819; distinguished himself in campaigns in Khandesh and against the wild Bhil tribes; aid-de-camp of Sir John Keane in the Afghan War; appointed political agent in Lower Sind, and subsequently commissioner at Haidarabad; resident at Satara, 1845; at Baroda, 1847; and at Lucknow, 1854; commander in chief of British forces in the Persian War of 1856-57; arrived in India in the midst of the Sepoy rebellion; relieved Havelock at Cawnpur, September 15th, then waived the command in favor of Havelock, whom he accompanied to the relief of Lucknow, September 25th; defended the residency and held the Alumbagh (Lucknow) during the subsequent siege by the rebels; aided Sir Colin Campbell in the final recapture of Lucknow, March, 1858; knighted and made lieutenant general, 1858; received the thanks of Parliament, 1860; became a member of the supreme council of India; retired, 1861; buried in Westminster Abbey; statues of him have been erected in London and Calcutta.

Ouzel, or **Ousel** (ô'z'l), name applied in England to several birds. Thus the "ousel cock" of Shakespeare was the European blackbird



EUROPEAN OUZEL.

(*Merula merula*). More frequently the name is applied to the water ouzel or dipper. Still other birds receive this name, but nearly all are thrushes or their allies.

Ovam'po, or **Ovambo**, Bantu people in German SW. Africa, living along the left bank of the Cunene River and some distance S. Ten divisions or tribes of this people have been described by explorers, and they are supposed to number about 100,000. The people are warlike, industrious, ingenious, and unusually honest.

Ovando (ô-vân'dô), Nicolas, abt. 1460-1518; Spanish administrator; b. Valladolid; was a distinguished knight of the Order of Alcantara, and held high positions in the Spanish court; 1501, was appointed governor of Española; left San Lucas, February 13, 1502, with thirty ships and 2,500 colonists; arrived at Santo Domingo, April 15th, and governed till July,

1509. He refused to let Columbus land in July, 1502.

Ovary, or *Ova'rium*, the essential part of the female generative apparatus in which the ova or eggs are formed, corresponding to the testis of the male. In adult woman the ovaries exist as two bodies of oval shape. The ovaries are subject to diseased conditions, chief among which are cancer and the occurrence of tumors and cysts.

Ovary (in plants). See **FLOWER**.

Oven Bird, or *Gold'en-crowned Thrush*, *N. American bird* (*Sciurus aurocapillus*) of the family *Mniotiltidae*; called oven bird from the shape of its nest, which is built on the ground and roofed over with a dome-shaped covering; is a shy, retiring bird, of an olive-brown color, 6 in. long, and is often seen running along the ground. The name is also given to certain S. American birds of the genera *Furnarius* and *Cinclodes*, belonging to the family *Furnariidae*.

O'verbeck, Johann Frederick, 1789-1869; German painter; b. Lubeck; settled, 1810, at Rome; embraced Roman Catholicism, 1814; was an apostle of the sentimental religious school in art, and founded a school which was celebrated in its day; chief works, "The Entrance of Christ into Jerusalem" (Lubeck), "Christ on the Mount of Olives" (Hamburg), "The Entombment" (Lubeck), and "The Triumph of Religion" (Frankfort).

O'verture, name given to the introductory movement, symphony, or elaborate prelude occurring in oratorios, operas, cantatas, and similar compositions. The overture, though complete in itself, is generally so framed as to bring the mind of the hearer into a correspondence of tone and sympathy with the leading traits of the work to which it is prefixed. The introduction of the overture as a distinct composition is ascribed to Scarlatti.

Ovid (full Latin name, **PUBLIUS OVIDIUS NASO**), 43 B.C.-18 A.D.; Roman poet; b. Sulmo, 90 m. from Rome, of a rich equestrian family; educated in the schools of the rhetoricians; traveled in Greece, Asia Minor, and Sicily, and lived then for many years in Rome; admired by all for his wit and his verses, until, in the latter part of 8 A.D., Augustus suddenly banished him to Tomi. It is probable that the direct cause was some participation as a confidant in the intrigue of Silanus and Julia, the granddaughter of Augustus, who suffered banishment the same year. At Tomi the favorite of the metropolis found life intolerable, and sent supplications to Augustus, but the emperor was immovable, and the poet died in exile. His works comprise "Heroides," twenty-one letters from heroines to their lovers, of which fourteen are regarded as genuine; "Amores," love elegies; "Ars Amatoria," "Remedia Amoris," "Metamorphoses," "Fasti," an unfinished poetical commentary on the Roman calendar; "Tristia," "Epistolæ ex Ponto," "Ibis," a bitter invective against an unknown person; "Halieutica," a fragmentary didactic poem on fishes. The tragedy "Medea" is lost. Of all Latin poets Ovid stands nearest to mod-

ern civilization. He also excels other Latin poets in the elegance of his form, especially in the character and rhythm of his verses.

Oviedo y Valdes (ô-vê-a'thō & vâl-thês'), **Gonzalo Fernandez de**, 1478-1557; Spanish chronicler; b. Madrid; long attached to the court; appointed royal historiographer; devoted himself especially to the history of America; chief works, "General History of the West Indies," giving the first detailed account of the discoveries in America, and a valuable work on contemporary biography.

Ovip'arous An'imals, animals which bring forth eggs; strictly speaking, those in which the egg leaves the maternal body before it has proceeded far in development. In some cases, as in many sharks and snakes, an intermediate condition exists. Here the egg, inclosed in protective membranes, is retained inside of the mother until the young is fully formed, without, however, any intimate connection existing between parent and offspring. For these forms the term *ovoviviparous* is used. Mammals are *viviparous*, i.e., bring forth perfect young.

O'vule, in botany, a young seed, especially before fertilization. The ovule is morphologically a surface outgrowth, and is to be regarded as a structure similar to hairs, scales, prickles, etc. In its earliest stages it is a few-celled mass of cells, projecting above the surface, and having a hemispherical or conical, and later a cylindrical, form, which may remain straight or become somewhat curved on itself. As it grows a ridge arises on it encircling it like a collar, and this by extension finally becomes a coat which incloses it.

O'vum, female reproductive body in all animals. In its simplest condition it is merely a cell of the body specialized for the purpose of the reproduction of the species, and distinguishable from the other cells chiefly from its larger size. In most forms, however, it has additional features of a nutritive or protective nature. Thus to the protoplasm of the cell there may be added *food yolk* which is to nourish the germ, and which is frequently so abundant as to render the egg very large. This food yolk may be variously arranged, and according to its distribution the subsequent development of the egg is modified. In some cases protective envelopes are absent. In others they occur, and may be grouped in two categories, primary and secondary. To the first belong the *vitelline membrane*, usually a thin but firm envelope covering the egg and secreted either by the egg or by the tissue in which the egg was formed. The secondary envelopes are formed by the ducts which convey the egg from the place of its origin (ovary) to the exterior. Of these the most prominent are the shell of the eggs of birds and reptiles, and similar structures in other forms. The egg as it leaves the ovary is not ready for development; it has first to undergo processes of maturation and impregnation, although in exceptional cases the egg may develop without the latter process. The common hen's egg contains not only the essential cell with nucleus and protoplasm, but yolk, membrane, white, and shell.

